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MOUNAT (A.) & HITIER (H.). **Essais de désinfection chimique des sols pour semis de Tabac.** [Experiments in the chemical disinfection of soils for Tobacco seed-beds.—*Ann. Inst. exp. Tabac Bergerac*, **3**, pp. 287–298, 1959. [Engl. summ.]

Applied 20 days before sowing in the spring of 1959 vapam (100 ml.) and methyl bromide (50 g./sq. m.) were effective against *Thielavia* [*Thielaviopsis*] *basicola* [**40**, 384], but by no means superior to the more economical treatment of steam sterilization.

STEINBERG (R. A.) & BOWLING (J. D.). **Induction of frenching of Tobacco in the field.**—*Tobacco, N.Y.*, **150**, 22, pp. 68–72; *Tob. Sci.*, **4**, pp. 101–105, 1 fig., 1960.

As a result of the field application of greenhouse findings at U.S. Dept Agric., Beltsville, Md (*Plant & Soil*, **7**, pp. 281–289, 1956), up to 100% frenching [**33**, 17, 642] was induced in Maryland Medium Broadleaf tobacco grown for the 3rd successive season in soil neutralized with lime and fertilized with Ca_2PO_4 and N (800 lb./acre), but the nutrient status of the soil was apparently of importance only as it affected the soil microflora. In a year of low rainfall frenching symptoms failed to appear, and they disappeared after autumn applications of N and S. These procedures, in conjunction with counts of rhizosphere and soil populations of *Bacillus cereus* [**32**, 153], should enable tobacco frenching to be produced or decreased.

CONOVER (R. A.) & STALL (R. E.). **Use of combinations of maneb and dyrene for control of Tomato diseases.**—*Proc. Fla hort. Soc.*, **72** (*1959*), pp. 204–207, 1960.

At the sub-trop. Exp. Sta. and the Indian River Field Lab. in trials in 1957–59, tomatoes were sprayed with 1·5 lb. 70% maneb, 2 lb. dyrene, or 1 lb. of each mixed (all/100 gal. water) using a power sprayer [**40**, 150]. For comparison at one locality 0·75 lb. 50% dichlone was included. When the sprays were applied at weekly intervals grey leaf spot (*Stemphylium solani*) was controlled best by maneb+dyrene, dyrene alone being next. Applied at 4–5-day intervals all 3 treatments gave equally good results. Under severe infection by *Botrytis cinerea* [loc. cit.] maneb+dyrene was equal to dyrene alone, and both were superior to dichlone, but under moderate infections all 3 gave equally good control. The best control of mild infections of blight (*Phytophthora infestans*) was afforded by maneb, then maneb+dyrene, and dichlone, dyrene alone being much inferior. It is concluded that maneb+dyrene sprays should control all tomato foliage diseases caused by fungi except under very severe epidemic conditions.

MAHADEVAN (A.). **Influence of various carbon and light sources on some cultural characters of Fusarium lycopersici.**—*Plant Dis. Reptr*, **44**, 12, pp. 943–945, 1960.

The cultural characters of *F.* [*bulbigenum* var.] *lycopersici* from wilting tomato plants were determined on a medium containing different carbohydrate sources and levels and under various light conditions at the Dept Bot., Univ. R.I., Kingston. The colour of the pigment and the degree of sporulation were profoundly affected by sugar conc. and light variations [cf. **36**, 204]. The av. growth of the cultures under these conditions is tabulated.

DERBYSHIRE (DOROTHY M.). **Seed transmission of Didymella lycopersici.**—*Plant Path.*, **9**, 4, p. 152, 1 fig., 1960.

Two samples of acid-extracted tomato seeds, vars. Baby Lea and Kondine Red, examined at the Dept Agric. & Fish., E. Craigs, Scotland, bore pycnidia of *Didymella lycopersici* [cf. **24**, 480; **40**, 64] within the testa.

BUCHANAN (T. S.). **Foreign tree diseases—threats to North American forestry.**—*J. For.*, **58**, 11, pp. 868–871, 1960.

In this note, adapted from a paper presented at the 7th International Forest Disease Work Conference, Pullman, Wash., Dec. 1959, it is observed that 3 of the most devastating tree diseases in the U.S.A., namely, white pine blister rust [*Cronartium ribicola*], chestnut blight [*Endothia parasitica*], and Dutch elm disease [*Ceratocystis ulmi*] were introduced before rigid quarantine restrictions were enforced. Such introduced diseases tend to be more serious than native pathogens and a long period may elapse between entry and build-up to serious proportions. Among other major forest pathogens not yet found in the U.S.A. are *Bacterium* [*Pseudomonas*] *savastanoi* [f.sp.] *fraxini* on ash, *P. rimaefaciens* on poplar, and *Bacterium* [*Erwinia*] *salicis* on willow. The work of the International Union of Forest Res. Organizations in investigating world-wide forest diseases is outlined.

WHITE (L. T.) & BASHAM (J. T.). **Defects in the second growth forest and their causes.**—Reprinted from *Woodland Rev.*, **61**, 8, 3 pp., 1960.

A discussion of the requirements of forest trees in relation to their environment [cf. **39**, 511] is followed by comment on the influence of mycorrhiza and their part in silviculture and the relation of diseases to failure of the site in fulfilling the demands of the tree. Reference is made to rusts, to the major part played by butt and root rots in second growth stands, and to trunk rots in regard to volume losses. It is the business of the forester to overcome maladjustment between trees and their environment in the light of available knowledge, which needs to be augmented.

WRIGHT (W. R.). **Storage decays of domestically grown Chestnuts.**—*Plant Dis. Reptr*, **44**, 11, pp. 820–825, 11 fig., 1960.

In co-operative studies between the Market Quality Res. Div., U.S. Dept Agric., Chicago, Ill., and the U.S. hort. Field Sta., Meridian, Miss., spp. of 12 gen. of fungi, many bacteria, and yeasts were isolated from stored Chinese chestnuts (*Castanea mollissima*). The most commonly encountered were *Phoma castanea*, *Dothiorella* sp., *Cytodiplospora castaneae* [*Cryptodiaporthe castanea*: **18**, 148], *Pestalotia quercina*, and *P.* sp., together comprising 75% of the isolates. Cultures of *Phoma*, *C. castanea*, and *Pestalotia* were killed by 243,000 rads of gamma irradiation; *Dothiorella* survived 250,000 but not 283,000 [cf. **40**, 26].

The high incidence of decay in bulk-stored nuts suggested that shelling or kernel grading, packaging, and quick freezing would be the most satisfactory way of dealing with the crop commercially.

CAMPANA (R.) & ROSINSKI (M.). **Septic culture of Ceratocystis ulmi on Elm wood.**—*Plant Dis. Reptr*, **44**, 12, pp. 908–911, 1960.

At the Maine agric. Exp. Sta., Orono, abundant coremia were produced, mostly in 3–6 days but occasionally up to 14 days, on non-sterile stripped elm stems $\frac{1}{4}$–$\frac{1}{2}$ in. diam. [**40**, 325] from inoculated trees, placed in corked vials or in Petri dishes moistened with damp paper. Data are not yet available on the possible antagonistic effects of fungal and bacterial contaminants on *C. ulmi*.

BOROVKOV (E. A.) & PONOMARENKO (L. F.). Новая болезнь деревьев в Таджикистане. [A new disease of trees in Tajikistan.]—Сел. Хоз. Таджикистана [*Sel.*

Khoz. Tadzhikistana], *1959*, 9, pp. 43–44, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 15, p. 171, 1960.]

The authors present data on the 1st occurrence in the bot. Garden, Acad. Sci. Tajik S.S.R., of *Graphium* [*Ceratocystis*] *ulmi* [cf. **40**, 250] on elm.

Zentmyer (G. A.). **Phytophthora canker of Macadamia trees in California.**—*Plant Dis. Reptr*, **44**, 11, p. 819, 1960.

At Dept Plant Path., Univ. Calif., Riverside, seedlings of *M. integrifolia* and *M. tetraphylla* were susceptible to an isolate of *P. cinnamomi* from *M. integrifolia* and another from avocado when introduced through a wound. Roots failed to become infected when plants were grown in soil infested with *P. cinnamomi*.

Craighead (F. C.) & Nelson (J. C.). **Oak wilt in Pennsylvania.**—*J. For.*, **58**, 11, pp. 872–881, 5 fig., 2 maps, 1960. [32 ref.]

Infection areas of oak wilt (*Ceratocystis fagacearum*) [**39**, 743 *et passim*] in Pa have not extended during the past 7 yr. on the evidence of air and ground surveys conducted by the Blain Oak Wilt Lab., Perry County. Timber losses during this period totalled 1,073,000 bd ft. with a stumpage value of $16,000, but $50,000 to $60,000 is spent annually in the State on control.

Nüesch (J.). **Beitrag zur Kenntnis der weidenbewohnenden Venturiaceae.** [Contribution to the knowledge on Venturiaceae on Willows.]—*Phytopath. Z.*, **39**, 4, pp. 329–360, 10 fig., 2 graphs, 1960. [Eng. summ. 66 ref.]

Many specimens from willows (*Salix* spp.) were studied at the Inst. für spezielle Botanik der Eidg. Technischen Hochschule, Zürich, including behaviour *in vitro*, mainly on malt agar. Host ranges were established by inoculations.

The sexual form of *Pollaccia saliciperda* is clearly different from *Venturia chlorospora* [**37**, 252] and is described as a new sp., *V. saliciperda* Nüesch. Five other spp., distinguished by ascospore size and shape and perithecial form, are recognized, viz. *V. chlorospora* (asexual state *Fusicladium*), two new spp., *V. helvetica* Nüesch on *S. helvetica* and *V. microspora* Nüesch on *S. nigricans* and *S. cinerea*, *V. subcutanea*, and *Epipolaeum longisetosum* (newly transferred from *V. longisetosa*), the asexual state of all these being unknown.

Miller (P. W.). **Relative resistance of Juglans regia seedlings to infection by Verticillium albo-atrum as determined by inoculations.**—*Plant Dis. Reptr*, **44**, 12, p. 919, 1960.

In investigations at Corvallis, Ore., of the cause of walnut tree decline [**38**, 38] *J. regia* seedlings were not susceptible to the race of *V. alboatrum* used.

Negrutskiĭ (S. F.). Корневая губка на Можжевельнике. [Root 'gubka' on Juniper.]—Лес. Хоз. [*Les. Khoz.*], **12**, 4, p. 80, 1960.

Analysis of *Juniperus sabina* infected by root 'gubka' [*Fomes* sp.] in plantations at different forestry establishments in the Sumskaya and L'vov regions, in the Tatar A.S.S.R., and elsewhere showed that the fungus infects only the extreme peripheral parts of the trunk and roots, mainly the phloem, cambium, and the cortex. Rotting of the phloem and cortex takes place very actively, so that the tree dries up in 1–3 yr. from infection, depending on age. The wood, however, hardly becomes decomposed. Inoculations demonstrated that in 1 yr. the fungus spreads 8–10 cm. round the point of entry and 10–12 cm. along the trunk. Death occurs much more quickly than in pine (5–6 yr.). External symptoms, which are described, are not pronounced. Weakened and dead standing trees and externally healthy ones in foci of infection should be felled and the remainder treated, for example, with oil: creosote (4:1).

Bratus' (V. M.) & Kyrylenko (T. S.). Швидкість руйнування деревини Сосновою губкою на різній висоті стовбура. [Rate of wood destruction by Pine 'gubka' at various stem heights.]—*J. Bot. Acad. Sci. Ukr.*, **17**, 4, pp. 46–53, 1 diag., 1 graph, 1960. [Russ., Engl., summ. 21 ref.]

At the Ukrainian Acad. agric. Sci., Kiev, U.S.S.R., pine wood destruction by red rot (*Phellinus* [*Fomes*] *pini*) was determined from the wt. loss of wood specimens (2×1·5×1·5 cm.) kept for 5 months in flask cultures of the fungus on beer wort agar with 6–8% sugar. Wood from 3·3–15·3 m. above ground was destroyed most, from 22·3 less, and from 0·3 less still. Since resin content, greatest at 0·3 m., decreased with the height of the stem, but increased in its upper part, a correlation is supposed to exist between mycelial growth and rate of wood destruction on the one hand and the amount of resin on the other.

Forest pathology.—*Rep. For. Res. Inst. N.Z., 1958–9*, pp. 28–32, 1960.

In this report [cf. **38**, 490] it is stated that 'GB' root rot and stem canker [**35**, 565] of *Pinus radiata* occurred in 1 new area, Whangapoua State Forest, Coromandel Peninsula. Further group dying was also found on 3–5-yr.-old *P. radiata* regeneration at Maramarua State Forest. As high incidence of *Phytophthora* spp., mainly *P. cinnamomi* was found near healthy as well as GB-diseased trees, it was assumed that *Phytophthora* spp. were not contributory to the disease.

Naemacyclus niveus on *Pinus radiata* and *P. ponderosa*, and *Phaeocryptopus gaeumannii* on Douglas fir [*Pseudotsuga menziesii*] were identified for the 1st time in N.Z. The latter was found only within a 60-mile radius of Taupo; no needle cast was associated with infection, even when severe.

Light frosts in Nov. 1958 and a wet summer predisposed many seedlings and saplings of *Pinus radiata* to attack by *Diplodia pinea*. In 4 nurseries losses from [unspecified] seedling diseases ranged up to 67% (av. 15%); soil from most nurseries harboured at least 1 pathogen but incidence varied widely.

Fergus (C. L.). **Illustrated genera of wood decay fungi.**—vi+132 pp., 118 fig., Minneapolis, Burgess Publishing Company, 1960. $4. [33 ref.]

This manual is intended primarily for the use of general foresters and for students taking a forest pathology course. Keys to the families of fungi that decay slash and timber and to the common genera of wood-decay fungi are followed by a key to 85 gen. (81 illustrated). There are also specific keys for the fam. and more important gen. In conclusion, there are a glossary and indexes to gen. and fam.

Kondrat'ev (S. F.) & Sadovnikova (Mme T. A.). Защита древесины. [Timber protection.]—198 pp., 16 col. pl. hors texte, 74 fig., 2 graphs, Kiev, Gosstroĭizdat Ukr. S.S.R., 1959. Roubles 11.50. [4 pp. ref.]

In a sect. on timber used in building (pp. 7–20) an account of wood-destroying fungi [**39**, 254] is given, accompanied by tables with descriptions and measurements of the spores and hyphae. Chapt. 4 'The chemical protection of timber from rotting' (pp. 66–97) describes control methods and chemicals, and chapt. 6 (pp. 105–114) deals with 'Methods for investigating and measures for liquidating rot foci in buildings'. Rots and stains are considered in appendix 1 (pp. 119–142), including an official list of standard terms for defects. Appendix 2 (pp. 142–148) concerns the 'Biological testing of antiseptics' for which pure cultures of *Coniophora puteana* are used. A complete scheme is outlined for the preparation of agar media, methods for protecting from contamination, culture storage, inoculating, preparation of wood samples for testing toxicity of the antiseptics, and assessment of results. A separate brochure provides 16 coloured plates of defects in wood caused by fungi (shown in fruit).

Russell (P.). **The inactivation of organo-mercurial fungicides by sulphur compounds in groundwood made from salt-water stored pulpwood.**—Reprinted from *Norsk Skogind.* 4, 11 pp., 4 fig., 1 graph, 2 diag., 1960.

Most of this information presented to a meeting of the Norwegian Paper and Pulp Engineers Association, Oslo, in Oct. 1959, has been noticed [**38**, 635]. When S-rich pulp from logs stored in salt water was extracted with pyridine, in which thiolignin is soluble, the pulp ceased to inactivate phenyl Hg acetate. An appendix to this paper by R. J. Peerless concerns chemical investigations of the S compounds involved.

Nieuwhof (M.), Garretsen (Frieda), & Wiering (D.). **Internal tipburn in White Cabbage. II. The effect of some environmental factors.**—*Euphytica*, **9**, 3, pp. 275–280, 2 graphs, 1960. [Dutch summ.]

In further plot trials on river clay (pH–KCl±6) at Inst. hort. Plant Breeding, Wageningen, Netherlands [cf. **40**, 256], tipburn in a highly susceptible str. of Langedijker Autumn White was favoured by early planting, late harvesting, and a heavy N dressing. There was a positive correlation between head weight and the occurrence of the disorder, which was favoured by factors stimulating head growth, though at the end of the growing season there may be an increase in the amount of tipburn without a further increase in head weight.

Conroy (R. J.). **Control Cauliflower diseases.**—*Agric. Gaz. N.S.W.*, **71**, 9, pp. 462–468, 9 fig., 1960.

Hot water seed treatment (18 min. at 50° C.) controls black rot [*Xanthomonas campestris*: **34**, 283] and black leg [*Erwinia carotovora*]. Seed beds may be sterilized with either ½–1½ gal./sq. ft. formalin or methyl bromide (2 lb.) against soil-borne organisms, including black rot, black leg, and club root [*Plasmodiophora brassicae*: **36**, 456]. Downy mildew [*Peronospora parasitica*] and mosaic [**39**, 751] are controlled by planting thinly and following with a nicotine+Bordeaux mixture spray. Whiptail (molybdenum deficiency) [**36**, 576] is corrected by 1 oz. pure ammonium molybdate or 1¼ oz. pure (3 oz. crude, 43%) Na molybdate/10 sq. yd.

Gibbs (A. J.). **Studies on the importance of wild Beet as a source of pathogens for the Sugar-Beet crop.**—*Ann. appl. Biol.*, **48**, 4, pp. 771–779, 1 map, 1960. [24 ref.]

The incidence in autumn 1958 and summer 1959 of beet yellows virus, beet mosaic virus, *Uromyces betae*, and *Peronospora schachtii* [cf. **37**, 195] in stands of wild beet (*Beta vulgaris* ssp. *maritima*) at 30 sites on the foreshores of Wales and S. England is recorded from Rothamsted [cf. **36**, 813; **37**, 613]. The diseases were common, the viruses being more prevalent in the E. than in the W., *U. betae* the reverse, and *P. schachtii* equally prevalent at all sites.

No evidence was obtained of spread of beet yellows in E. Anglia from wild beet to sugar beet and *Myzus persicae* was seldom present on wild beet growing on the foreshore. In the glasshouse *M. persicae* colonized sugar beet plants watered or sprayed with tap or distilled water in preference to those treated with sea water; daily watering with sea water made the plants unpalatable to the aphids in 14 days or less; salt solutions gave results similar to those obtained with sea water.

Russell (G. E.). **Sugar-Beet yellows : further studies on viruses and virus strains and their distribution in East Anglia, 1958–59.**—*Ann. appl. Biol.*, **48**, 4, pp. 721–728, 1960.

In further studies at the Plant Breeding Inst., Cambridge [cf. **38**, 170], it was established that sugar beet yellows virus and sugar beet mild yellowing virus (SBMYV) were present in commercial sugar beet crops in E. Anglia in both years,

and the absence of close relationship between them was confirmed. SBMYV, more frequent in the N. of the region, was more prevalent than yellows over the whole area in 1958, but in 1959 the opposite held.

It was possible to identify both viruses in the field by symptoms: SBMYV alone caused bright orange leaves without brown or red necrotic spots which were more subject to attack by secondary fungal pathogens than leaves infected by yellows; these often showed vein etch in the centre leaves soon after infection and always had brown or red necrotic spots on old infected leaves. Infection by both viruses caused a combination of these symptoms.

Breeding for tolerance of SBMYV may be at least as important economically as breeding for tolerance of yellows, a wide range of strs. of which was present in E. Anglia in 1959, chiefly those causing severe symptoms in sugar beet and *Chenopodium capitatum*.

HULL (R.). **Sugar Beet yellows in Great Britain, 1959.**—*Plant Path.*, **9**, 4, pp. 151–152, 1960.

Despite dry weather favouring aphid infestations, in 146 fields sampled averages of 0·5, 6, 14·9, and 26·2% of the sugar beet plants were affected by yellows virus [cf. **39**, 516] at the end of June, July, Aug., and Sept., respectively. Of the entire crop (409,000 acres) 18·5% had < 1% infection; 41·9%, 1–20%; 30·9%, 21–60%; and 8·7%, > 60% infection at the end of Aug. A total of 381,000 acres was sprayed. Sugar yield was increased by 26% if spray was applied when the warning was issued.

CHOD (J.). **Zvláštnosti některých parenchymaticko-cévních infekcí u Řepy Cukrové, vyvolaných Bac. betae Migula, syn. Bac. bussei Migula.** [Peculiarities of some parenchyma-vascular infections of Sugar Beet, caused by *Bac*[*illus*] *betae* syn. *Bac*[*illus*] *bussei*.]—*Ann. Acad. tchécosl. Agric.*, **33**, 8, pp. 1079–1082, 1 pl., 1960. [Russ., Engl. summ.]

At the Beet Res. Inst., Semčice, Czechoslovakia, a root bacteriosis of the Dobrovice var. caused by the above pathogen [cf. **22**, 512; **32**, 414] spread from the vertical axis to the exterior intervascular parenchyma and from the lower part of the hypocotyl to the root tip. One of the initial symptoms was the darkening of intervascular tissues which tended to liquefy. The central vascular bundle area beneath the hypocotyl was most susceptible. In a diffuse type of infection the epicotyl remained mostly unharmed and bore viable buds which started to bud normally, but within 7–10 days they began to wilt and died away. Inoculation with a bacterial suspension gave similar results.

SCHMIDT (TRUDE). **Ein Beitrag zur Bekämpfung der Brennfleckenkrankheit der Erbse (Ascochyta pisi L.).** [A contribution to the control of Pea leaf and pod spot (*A. pisi*).]—*PflSchBer.*, **24**, 5–7, pp. 91–97, 1 graph, 1960. [Engl. summ.]

The results of seed dressing tests with pea seed naturally infected by *A. pisi* [cf. **39**, 272] are reported from the Bundesanstalt für Pflanzenschutz, Vienna. Thiram products increased emergence and considerably reduced primary seedborne infection. Best results in preventing secondary infection in the field were obtained by spraying with a phaltan product, HL 877; next in effectiveness was coprantol (Cu oxychloride).

GRAY (E[LIZABETH] G.) & FINDLATER (W. T.). **Sclerotinia sclerotiorum on Peas in Kincardineshire.**—*Plant Path.*, **9**, 4, pp. 130–132, 1 pl., 1960.

During July 1957 *S. sclerotiorum* attacked 3 crops of peas grown for processing, constituting a new host record for Gt Britain. In severe attacks ⅓ of the plants were killed and the yield reduced from 40 to 13 cwt./acre. By 1959 the disease was present on 5% of the plants in the county.

MESSIAEN (C. M.). **Moyens de lutte contre l'anthracnose du Haricot.** [Means of controlling Bean anthracnose.]—*Phytiatrie-Phytopharm.*, **9**, 3, pp. 191–195, 1960.

In field tests at I.N.R.A. Sta. de Pathologie Végétale du Sud-Est, Montfavet (Vaucluse), France, against anthracnose (*Colletotrichum* [*lindemuthianum*]) on bean [*Phaseolus vulgaris*: cf. **35**, 635, *et passim*], seed with 10% natural infection being used, the best results (10·6% av. infection for all pickings) were given by thiram (1 kg./hl.) at the 2-leaf stage, followed by 2 further applications at 300 g./hl., 1 at flower bud formation and 1 at flowering. Following the 1st treatment alone there was an av. of 15·8% infection, and in the untreated 54·2%. Even better results would have been obtained if the treated plots had not immediately adjoined the untreated.

STRIDER (D. L.). **Control of Cladosporium spot of Southern Pea.**—*Plant Dis. Reptr*, **44**, 12, p. 955, 1960.

In field trials at N. Carol. State Coll., Raleigh, only Louisiana Purchase and Blue Goose of 18 vars. of cowpea were rated resistant to *C. vignae* [cf. **21**, 238]. Control on susceptible vars. by maneb (1½ lb./100 gal.), applied at bloom and then weekly and after heavy rains, was superior to the 3 other compounds tested though inadequate.

SUN (S.-D.). Соя. [Soybean.]—248 pp., illus., Moscow, Sel'khozgiz, 1958. Roubles 11.15. [3 pp. ref.]

In chapt. 13 (pp. 231–240) of this work translated from the Chinese, pests and diseases of soybean in China are recorded, with short notes on symptoms, distribution, and controls. Among those listed are soybean mosaic virus, *Cercospora sojina*, *Peronospora manshurica* [**37**, 400], *Xanthomonas glycines Septoria glycines*, and *Uredo sojae*.

PIETKIEWICZ (T. A.). **Z badań nad mikroflorą nasion Soi.** [From studies of Soybean seed microflora.]—*Roczn. Nauk rol.*, Ser. A., **79**, 4, pp. 1077–1090, 1959. [Russ., Engl. summ. 60 ref.]

At Inst. Plant Prot., Reguły, fungi detected on 162 samples of soybean seed from various parts of Poland included *Fusarium martii* var. *minus*, *F. anguioides*, *F. poae* f. 1, and *Botrytis cinerea*, all causing seed decay and sometimes seedling infection, notably a cotyledon rot. *Peronospora manshurica*, in 2 of the samples, was recognized by milk white spots on the seed surface. The *F.* spp. and to some extent *B. cinerea* penetrated deeply into the internal tissues and could not be controlled by standard seed disinfectants. The seed was conveniently examined by plating on potato-dextrose agar containing the Na salt of 2,4-D at 50 mg./l. or by placing on moist filter paper treated with the same salt.

VERHOYEN (M.). **Quelques recherches et observations relatives à une virose tropicale : la 'rosette de l'Arachide' (Arachis hypogaea L.).** [Researches and observations on a tropical virosis: rosette of Groundnut.]—*Parasitica*, **16**, 3, pp. 95–117, 1 graph, 1960. [32 ref. Flem., Engl. summ.]

At INEAC, Belgian Congo, and later at Inst. agron., Louvain, Belgium, groundnut rosette virus from Yangambi, Belgian Congo [**34**, 583], was transmitted by grafting and by *Aphis craccivora* [cf. **36**, 230, *et passim*] but not mechanically.

The aphids, in which the virus is persistent, became infective within 4 hr. of feeding on a plant source. The alatae transmitted more slowly than aptera and nymphs. Contact insecticides to destroy the aphids before they infect the plants are recommended. Reduction of spacing between the plants does not increase the effect of entomophthoraceous fungi, as ants protect the aphids against these parasites.

Fewer chloroplasts are present in discoloured than in normal areas of groundnut leaves, and the cells of affected internodes are shorter than those of healthy ones. Photosynthetic substances are present only in the green parts of the leaves. The lack of root formation on cuttings from infected plants and the non-etiolation of diseased shoots in darkness suggest a disturbance of the auxins.

Hickman (C. J.) & Coley-Smith (J. R.). **Onion white rot.**—*N.A.A.S. quart. Rev.*, **50**, pp. 58–62, 1960. [13 ref.]

A résumé of work at Univ. Birmingham on onion white rot (*Sclerotium cepivorum*) [**39**, 647, *et passim*].

Guillemat (J.) & Bigot (C.). **Microflora fongique d'un sol du Puy-de-Dôme et de la rhizosphère de l'Ail. Incidence du traitement des cayeux contre Sclerotium cepivorum Berk. sur cette microflore.** [The fungus microflora of a soil in the Puy-de-Dôme and of the rhizosphere of Garlic. Effect upon this microflora of the treatment of garlic cloves against *S. cepivorum*.]—*Ann. Épiphyt.*, **11**, 2, pp. 217–249, 5 graphs, 1960. [Engl., Germ. summ.]

At the École nat. Agric., Grignon, France, 127 spp. of fungi were identified in an argillaceous-calcareous soil near Clermont-Ferrand. The soil was then inoculated with *S. cepivorum* and planted in Mar. with garlic bulbs treated with thiram, copper oxyquinolinate, captan, or 1-oxide-2-pyridinethione. At 1 month after planting little change in the soil microflora was detectable. *S. cepivorum* was isolated from the test soil in May and June, by which time the disease was already present everywhere in the field. On the roots *Fusarium* spp. were largely dominant and were evidently normally present.

Aycock (R.) & Jenkins (J. M.). **Methods of controlling certain diseases of Shallots.**—*Plant Dis. Reptr*, **44**, 12, pp. 934–939, 1 fig., 1960.

At the hort. Crops Res. Sta., Castle Hayne, N. Carol., a pre-planting dip in dowicide B ($1\frac{3}{4}$ or 3 lb./100 gal.) of bulbs infected by *Botrytis allii* increased yields by more than 50% over the untreated. Yields of reasonably healthy bulbs were not increased. Its use on dried bulbs after curing improved their appearance and reduced the incidence of *Aspergillus niger*. Storage losses were reduced when bulbs were dried naturally in the field rather than in heat chambers. Soil treatments with quintozene (50 lb./acre in 2 lots) reduced *Sclerotium rolfsii*, particularly at harvest, from 21·8% infected bulbs to 12% and is useful in seasons with high soil temp. in Apr., when the disease causes serious losses.

Watson (Marion A.). **Carrot motley dwarf virus.**—*Plant Path.*, **9**, 4, pp. 133–134, 3 fig., 1960.

In this short account of the disease [**40**, 2] field experiments at Woburn exp. Farm, Beds., are reported in which carrot crops, though sprayed with insecticides, became infested with aphids and yielded only about $4\frac{1}{2}$ tons/acre, the same as the untreated, whereas 15 tons/acre are expected from a healthy crop. Carrots from 7 counties in England have been shown to be infected by motley dwarf, which appears to be of economic importance.

Harrison (D. S.) & Thayer (P. L.). **Comparison of an air carrier sprayer and a boom type sprayer for control of early blight on Celery.**—*Proc. Fla hort. Soc.*, **72** (*1959*), pp. 139–141, 4 diag., 1960.

In spraying trials at Belle Glade better control of celery early blight (*Cercospora apii*) [**38**, 175] was given by nabam+$ZnSO_4$ applied by a boom sprayer than from an air carrier sprayer, owing to the inferior penetrating power of spray from the latter machine, which gave a less dense deposit on the lower leaves.

O'Brien (Muriel J.) & Webb (R. E.). **Preservation and germinability of conidia of Peronospora effusa (Grev. ex Desm.) Ces.**—*Plant Dis. Reptr*, **44**, 11, pp. 834–836, 1960.

In further studies at Beltsville, Md, spinach was infected by *P. effusa* conidia which had been stored at −10° F. for 8 months [**38**, 440]. Germinability was adversely affected by defrosting and refreezing inoculum during storage and before testing. Loss of germinability increased progressively from the beginning of storage at −10°.

Lipton (W. J.) & Harvey (J. M.). **Decay of Artichoke bracts inoculated with spores of Botrytis cinerea Fr. at various constant temperatures.**—*Plant Dis. Reptr*, **44**, 11, pp. 837–839, 2 graphs, 1960.

At the Market Quality Res. Div., U.S. Dept Agric., Fresno, Calif., infections by *B. cinerea* [**4**, 327] were initiated more frequently at the tip of the bract than at the point of abscission; the rate of decay increased from 0–20° C. Bracts with injured tips decayed much more rapidly than sound ones. During marketing decay would be considerably reduced by maintaining a low temp. and avoiding injury.

Diseases of Rhubarb. *Agric. Gaz. N.S.W.*, **71**, 9, pp. 470–473, 4 fig., 1960.

The symptoms and control of downy mildew (*Peronospora jaapiana*) have been noticed [**30**, 22]. Leaf spot (*Phyllosticta straminella*) [cf. **14**, 7] causes small circular brownish spots which enlarge and develop reddish-brown borders and may eventually leave 'shot-holes'. Control is the same as for downy mildew, viz., weekly spraying with 1:1:10 Bordeaux mixture. Heavy rust (*Puccinia rhei-undulati*) [**33**, 591] may cause death of the leaves. Plants affected by crown rot (*Phytophthora parasitica*) [**22**, 422], which may be severe in wet or badly-drained soils, should be removed and burned. Rhubarb should not be planted in soil contaminated by *Sclerotium rolfsii* [**27**, 47].

Arnoux (M.) & Messiaen (C. M.). **Essais de désinfection du sol contre la verticilliose de l'Aubergine.** [Soil disinfection tests against verticilliosis of Eggplant.] —*Phytiatrie-Phytopharm.*, **9**, 2, pp. 115–121, 1960.

Following a preliminary indoor test with 5 soil disinfectants against infection of eggplants by *Verticillium albo-atrum* [cf. **35**, 506; **38**, 725, *et passim*], of common occurrence in Vaucluse and the Bouches-du-Rhône, a field near Avignon was soil-injected with chloropicrin at 50 ml. sq. m. Only a relatively small increase in yield resulted, but conditions did not favour a severe attack. The increase was greatest at the 1st (and most profitable) harvest, and subsequently diminished, but it is of commercial interest, and the use of chloropicrin in market gardens might be permissible under strict supervision.

Van Regenmortel (M. H. V.). **Zone electrophoresis and electron microscopy of a Watermelon mosaic virus from South Africa.** *Virology*, **12**, 1, pp. 127–130, 4 fig., 1960.

Cucurbit crops in S. Africa are being increasingly affected by a severe mosaic caused by a virus similar to the most prevalent virus of cucurbits in southern California [cf. **38**, 646] with particles 700–800 × 13 mμ. An isolation procedure has been developed at the Univ. Cape Town Virus Res. Unit.

Chen (C.-P.), Sung (C.-C.), & Ho (C.-C.). **A brief report of the discovery of oospores of downy mildew of Cucumber (Pseudoperonospora cubensis (Berk. & Curt.) Rostov.).**—*Zhibing Zhishi*, **3**, 6, pp. 144–145, 3 fig., 1959. [Chinese.]

In 2 out of about 100 pieces of cucumber leaf tissue from outdoor plants grown near Shenyang and in the Port Arthur–Dairen area in 1958, dried and stored in the hothouse during the winter and spring 1958–9 at the Shenyang [Mukden] agric. Inst.,

oospores of *P. cubensis* [**39**, 528], one of the serious diseases in cucumber-growing areas of N. China, were detected. They were light yellow or hyaline, thin-walled, containing 1–2 oil globules, and averaged 25–33 × 25–31 μ (100 measured). The oogonia were oval, flat spherical, or spherical, and 33–41 × 33–40 μ; the inner oogonium wall was directly adjacent to the oospore wall. Sometimes a nipple-shaped protrusion could be seen on the oospore wall. This is the first time oospores have been found in China. The discovery indicates that *P. cubensis* overwinters as oospores in the Shenyang area and they serve as a primary source of infection in the following yr.

Staněk (M.) & Wasserbauer (R.). **Postřik Okurek preparátem fytostreptem, obsahujícím streptomycin a terramycin proti skvrnitosti listů vyvolané bakterií Pseudomonas lachrymans (Smith et Bryan) Carsner.** [Spraying of Cucumbers with the preparation phytostrept, containing streptomycin and terramycin, against leaf spot caused by the bacterium *P. lachrymans*.]

Staněk (M.) & Přeslička (M.). **Působení postřiku antibiotickým přípravkem fytostreptem na růst Okurek a na sklizeň plodů.** [Effect of spraying with the antibiotic preparation phytostrept on the growth of Cucumbers and their fruit crop.]—*Ann. Acad. tchécosl. Agric.*, **33**, 8, pp. 1147–1162, 6 fig., 2 graphs; pp. 1191–1204, 4 graphs, 1960. [Russ., Germ. summ. 17+16 ref.]

At Res. Inst. Plant Production, Ruzyně, a 0·1% solution of phytostrept [**38**, 176; **39**, 504, 692] inhibited the growth of *P. lachrymans* on meat-peptone broth, reduced leaf infection on young cucumbers grown in a moist chamber from 75·3 to 3·6–6%, and on cultivated cucumbers from 59·4 to 11·2% after 2 applications. Spraying the upper leaf surface protected the lower surface also. Within a fortnight of treatment with 0·05 and 0·1% sols. green matter wt. increased by 21 and 11%, respectively, and yields by 39–87%. Apart from leaf damage to young plants by conc. over 1% the phytotoxic effect of phytostrept was slight. The growth period of treated cucumbers was extended by 14–21 days.

The 2nd paper contains further data on different concs. of phytostrept, the time and frequency of application, the green matter wt. of treated plants, and yields.

Simmonds (J. H.). **Science Branch. Plant Pathology Section.**—*Rep. Dep. Agric. Qd, 1959–60*, pp. 62–64, 1960.

Some of the information in this report [cf. **39**, 372], for the year ending 30 June 1960, has been noticed. Following hot, dry weather in Feb., citrus black spot (*Phoma* [*Guignardia*] *citricarpa*) [**40**, 306] appeared very early, fruit of certain vars. being affected some months before maturity.

Two new races of wheat stem rust [*Puccinia graminis*: cf. **39**, 546] have appeared; one, 34–3, attacks Gabo and *Triticum timopheevi* and the other behaves like race 21–2 but also attacks mature Spica plants. Below-average rainfall during the growing season resulted in increasing severity of wheat crown rot (*Fusarium* [*graminearum*]); Lawrence and Festival were more resistant than other vars. In one field there was up to 40% infection of wheat by *Sclerotium rolfsii*.

The presence of *P. polysora* on maize [map 237] was definitely confirmed. In a maize field trial differences in susceptibility to brown spot (*Physoderma zeamaydis*) [*P. maydis*: cf. **36**, 307], serious in Tableland Crops, were observed.

Verticillium dahliae caused a widespread wilt of groundnuts. A groundnut chlorosis responsible for losses up to 10% was caused by tomatos potted wilt virus.

In a field trial strawberry crops gave an increased yield of 50% following fortnightly applications of 50% captan (2 lb./100 gal.), mainly owing to control of grey mould (*Botrytis* sp.), *Gloeosporium* fruit rot, and flower blight (*Botrytis* and *Gloeosporium*).

Plants of the corky passion vine (*Passiflora suberosa*) were found to be naturally infected with a virus causing tip blight of passion fruit, which was transmissible by *Myzus persicae*. The tolerant *P. suberosa*, showing mottling only, may thus be an important source of infection of passion fruit.

Adequate control of banana leaf speckle (*Mycosphaerella musae*) [cf. **39**, 727] was achieved by the treatment for *Cercospora* [*M. musicola*] leaf spot, consisting of Cu oxychloride—white oil—malachite green at 50–60 gal./acre [**38**, 296] applied by air-blast machines. At least 8 acres/day may be treated.

An attempt is being made to combine the resistance of Beauty Redlands bean [*Phaseolus vulgaris*] to rust [*Uromyces appendiculatus*], anthracnose [*Colletotrichum lindemuthianum*], common mosaic [virus], and halo blight [*Pseudomonas phaseolicola*] with that of 121–2–3 to rust and angular leaf spot [*Isariopsis griseola*].

A new celery disease characterized by black sunken areas causing death of the leaflets when near the bases or of the whole plant when in young growth at the centre appeared in 2 districts near Brisbane. A *Colletotrichum* sp. was isolated and reproduced the disease on 3 celery vars. in the greenhouse.

Watermelon mosaic virus [cf. **38**, 646] has reduced the yield of pumpkins and other cucurbits in the Brisbane and Gatton districts.

Johnston (A.). **A preliminary plant disease survey in Sarawak.**—17 pp., Rome, Food and Agric. Organization of the United Nations, 1960. [Mimeographed.]

This 3rd survey made on the recommendation of the Plant Protection Committee for the S.E. Asia and Pacific Region [cf. **40**, 151] indicates that, owing to the scattered nature of the cultivation, the plant disease situation is not serious. Control of importation of planting material is recommended. Among the major diseases of black pepper are foot rot (*Phytophthora* sp.) [**40**, 74, 272] and a probable virus disease [**39**, 482]. Potentially the most important rice disease is *Piricularia oryzae* [map 51].

Coconut palms at Sematan suffer from a wilt of unknown etiology. In affected trees the outer leaves died prematurely, turning light reddish-brown and hanging down round the trunks, and midribs of some of the next youngest leaves broke, the distal end of the leaf hanging down. Old leaves died more rapidly than new ones were produced, so that at a later stage only a few small, stiff, yellowish fronds remained. Young nuts were shed prematurely soon after initial leaf symptoms but older ones were often retained. Trees under 20 yr. of age were unaffected. Death follows very rapidly after the symptoms appear. It is recommended that all affected palms should be destroyed.

Jaarverslag 1959. [Annual report 1959.]—*Meded. LandbProefst. Suriname* 22, 116 pp., 12 pl. (23 fig.), 5 graphs, 1 diag., 1960.

Some of the information in the sections on phytopathological studies (pp. 89–97) and plant disease service (pp. 98–100) [cf. **39**, 537] have been noticed. H. A. Van Hoof studied the population movements of *Sogata orizicola*, vector of rice 'hoja blanca' virus round Paramaribo and in Nickerie. In 1959 diseased plants were 1st observed on 11 June in the Prins Bernhard dyke, Nickerie; they had evidently been infected in the seed-bed. Not until the end of July was any increase of incidence apparent, but during Aug. almost the entire district was invaded, though at no time did the amount of infection exceed 1%. Coincident with the ripening of the crop and reduction of the insect population the symptoms largely disappeared in Sept. Details are given of transmission tests, the breeding of *S. orizicola*, and the construction of an insect-free cage for the cultivation of rice plants.

Virus symptoms were also observed on *Echinochloa colonum* [cf. **40**, 167] and shown to be transmissible by *S. cubana*. An [unnamed] delphacid was also concerned in the transmission of a virus responsible for the dying-off of *Digitaria decumbens*.

J. H. Van Emden investigated a coffee disease characterized by the development of fissures running through the bast in a steep spiral, sometimes resulting in necrosis down to the wood and the formation of a wound up to 1 cm. wide. Cessation of the attack is frequent, accompanied by healing from the margins inwards. Transverse sections through the wood reveal concentric brown stripes which may represent overgrown wounds. The disease is prevalent locally and merits further study.

F. A. Del Prado found that the brown to black spots on the branches of cacao (sel. ICS-95) were caused by *Cephaleuros virescens*. Young plants from the Netherlands were attacked by *Phytophthora* sp.

Corticium [*Pellicularia*] *koleroga* [cf. **35**, 171] was detected on a grapefruit branch.

In addition to the usual fungus pathogens of rice *Trichoconis padwickii* [map 314] was increasingly common in the W.

The newly introduced tomato vars. Manalucie and Anahu proved highly susceptible to *Cladosporium fulvum*.

Uromyces phaseoli [*U. appendiculatus*: map 290], formerly sporadic, has become widespread on beans [*Phaseolus vulgaris*] in the Kwalla area.

Cabbage was attacked by *Xanthomonas campestris* and *Erwinia carotovora*, while *Sclerotinia* sp. was found for the 1st time on Chinese cabbage.

Celery leaves were severely damaged by *Septoria apii*.

Leaf spots due to *Colletotrichum papayae* were observed on papaw for the 1st time for 7 yr.

Fulton (J. P.), Slack (D. A.), Fulton (N. D.), Dale (J. L.), Goode (M. J.), & Templeton (G. E.). **Plant pathology laboratory manual. 2nd edition.**—iv + 95 pp., 18 pl., Minneapolis, Burgess Publishing Co., 1960. $3.00. [Photo-offset.]

This useful handbook [cf. **35**, 624] has been enlarged to contain descriptions of 38 common plant diseases caused by bacteria, fungi, nematodes, and viruses, presented on the same lines as before. A glossary of 174 terms is appended.

Peĭve (Ya. V.) & Peterburgskiĭ (A. V.) (Editors). Химия в сельском хозяйстве. [Chemistry in agriculture.]—248 pp., illus., Moscow, Sel'khozgiz, 1959.

The book contains sect. on fungicides (pp. 155–156), chemicals for dry and wet seed treatments (pp. 157–165), and a chapt. on micro-elements in agriculture (pp. 234–248).

Duddington (C. L.). **Micro-organisms as allies. The industrial use of fungi and bacteria.**—256 pp., 16 pl., 21 fig., London, Faber & Faber, 1961. 25*s*. [19 ref.]

In this book, intended for the layman as well as for students of microbiology, the author describes various aspects of industrial fermentation, including brewing, wine- and bread-making, preparation of antibiotics, and manufacture of industrial chemicals by biological methods. Chapt. are included on vinegar fermentation, 'the craftsman's bacteria', with reference to miscellaneous fermentation processes such as those of milk products, and on nitrogen-fixing bacteria.

Logan (C.). **Host specificity of two Xanthomonas species.** —*Nature, Lond.*, **188**, 4749, pp. 479–480, 2 fig., 1960.

At Cotton Res. Sta., Namulonge, Uganda, attempts were made to induce adaptation to bean (*Phaseolus vulgaris*) in *X. malvacearum* [cf. **38**, 300]; 7–9 days after needle inoculation the bacterium was re-isolated from leaf vein tissue of Banja bean at the sites of the puncture and reinoculated on bean 5 times. Comparison with water inoculum (5×10^7 bacteria/ml.) atomized over bean leaves until water-soaked and similar normal inoculum gave no indication that the pathogenicity of

the 'trained' bacterium to bean (multiplication to produce a slightly water-soaked appearance) and cotton had altered. In another experiment using bean leaves as the sole medium for multiplication inoculum-sprayed leaves developed diffuse water-soaked spots within 2–3 days; they did not increase, but dried to sunken, light brown, necrotic areas; at 1 week filtered extracts from macerated spots were used for repeated spray inoculation and re-isolation. At the 7th re-isolation pathogenicity was the same as that of the original 'untrained' suspension.

In an attempt to induce *X. malvacearum* to break down the resistance of the cotton var. BAR 12 15 (B_2B_{6m}) the isolation-inoculation process was repeated 15 times with no suggestion of change in virulence.

The pathogenicity of *X. phaseoli* var. *fuscans* on cotton and bean was also unaffected by re-inoculation; the lesions on bean were more water-soaked and later became more well-defined than those caused by *X. malvacearum*.

It is concluded that if specific host reactions are to serve as a criterion for the classification of the genus [cf. **39**, 3], the environmental conditions and the maturity of the host at the time of inoculation, inoculation technique, and the conc. of inoculum should be standardized.

Győrffy (B.). **The effect of some chemical mutagens upon Xanthomonas phaseoli variety fuscans.** *Abh. dtsch. Akad. Wiss. Berl.*, Kl. Med., *1960*, pp. 110–115, 1960. [*Chem. Abstr.*, **55**, 1, col. 671 g, 1961.]

Among results obtained at the Inst. Genetics, Budapest, Hungary, the enhanced resistance to streptomycin in cultures of *X. phaseoli* var. *fuscans* by treatment with caffein, imidazole-4,5-dicarboxylic acid, or 4-methyl-2-thiouracil may be noted.

Tröger (R.). **Studien zur fungiziden Wirkungsweise der Kupfer-Kalzium-Verbindungen.** [Studies on the mode of fungicidal action of copper-calcium compounds.] —*Phytopath. Z.*, **40**, 1, pp. 91–106, 2 fig., 1960. [Engl. summ. 28 ref.]

In further work at Inst. für allgemeine Botanik, Friedrich Schiller Univ., Jena, Germany, the amount of Cu detected in conidia of *Fusarium decemcellulare* [*Calonectria rigidiuscula*: **38**, 181] treated with $CuSO_4$ or Ca-Cu compounds was influenced quantitatively by Ca. Conidia adhering to residues of Bordeaux mixture will be quickly saturated with Cu owing to the affinity for metals of the conidial surface. No liquid water is necessary for the saturation of the conidia with metal from residues of Cu sprays, but it is necessary to ensure that the hygroscopic substances of the conidial surface can swell. These results provide an explanation of the hypothesis of Goldsworthy and Green [**15**, 595].

Vasil'evskiĭ (A. P.). Стабилизаторы медно-мыльных препаратов. [Stabilizers for copper-soap preparations.] —Бюлл. глав. бот. Сада, Москва [*Byull. glav. bot. Sada, Moskva*], *1960*, 38, pp. 79–82, 1 fig., 1960.

The effect of various admixtures to sodium soap + $CuSO_4$ sol. (4 g. + 2 g./l.) to prevent its coagulation was assessed by the degree of its permeability through gauze. On the basis of these tests an effective fungicide against mildews of rose [*Sphaerotheca pannosa*], cineraria and chrysanthemum [*Oidium chrysanthemi*], and cucumber [? *Erysiphe cichoracearum*] was prepared by diluting potassium soap (250 g.) in hot water + denatured or raw alcohol (0·1 + 0·06 l.), and adding dissolved mustard powder (20 g./0·1 l.) as stabilizer and a boiling $CuSO_4$ sol. (20 g./0·06 l.), to be sprayed at 0·025–0·05 l./l. water. Good results were also obtained from this substance combined with colloidal S and some insecticides.

Chitzanidis (Anna). **Untersuchungen über das Verhalten von Kartoffel- und Tomatenrassen der Phytophthora infestans (Mont.) de Bary gegenüber organischen und anorganischen Fungiziden.** [Studies on the reaction of Potato and Tomato races of *P. infestans* to organic and inorganic fungicides.] — *Phytopath. Z.*, **40**, 1, pp. 1–34, 2 fig., 2 diag., 12 graphs, 1960. [42 ref. Engl. summ.]

This work at Bonn Inst. was to determine whether the inferiority of zineb to Cu preparations in its effect on *P. infestans* on tomatoes [**40**, 65] could be connected with physiologic races. In field tests at 3 localities in Germany the reported difference in efficacy between organic and inorganic fungicides [**35**, 204] could not as a rule be confirmed. Isolations in 1957–59 showed that tomato fruits were infected principally by potato races 0 and 4, which are not able to attack tomato foliage. They occur considerably earlier than the tomato races (T 1, T 7, T 9), which can infect both foliage and fruit. In a plant test all isolates of the 2 potato races and the 3 tomato races proved equally susceptible to Cu oxychloride and zineb, with the exception of potato str. Kc (race 0).

The spore germination test showed significant differences between individual strs. but there were no differences between the races. In no case, however, was the sensitivity to Cu oxychloride greater than that to zineb.

Race changes [cf. **40**, 240] could not be induced experimentally either by passage effect or by mutation inducing agents. A spontaneous change of pathogenicity from potato race 0 to 4 [**38**, 539] did not bring with it any change in sensitivity to Cu oxychloride.

McKinley (W. P.) & Magarvey (Shirlean A.). **Paper chromatography of ferbam, maneb, nabam, thiram, zineb, and ziram.**—*J. Ass. off. agric. Chem. Wash.*, **43**, 3, pp. 717–720, 1960.

Descriptions are given from the Food and Drug Lab., Dept nat. Hlth, Ottawa, Canada, of a chromatographic procedure resolving these dithiocarbamates into 2 groups; a technique whereby pesticides containing thioketone or mercaptan groups can be distinguished from others; and tests for the identification of individual dithiocarbamates.

Tomizawa (C.), Sato (T.), & Yoshii (H.). **Intake of fungicides by fungus spores.** Sato (T.) & Tomizawa (C.). **Decomposition of zinc ethylenebisdithiocarbamate (zineb) applied to plants.**—*Bull. nat. Inst. agric. Sci. Tokyo*, Ser. C, *1960*, 12, pp. 171–180, 7 graphs; pp. 181–187, 1 pl., 2 fig., 1960. [Jap. summ. 12 ref.; 12 ref.]

In further studies [cf. **37**, 54] the intake of Hg^{203}-labelled phenyl mercuric acetate (PMA) by spores of *Piricularia oryzae*, *Cochliobolus miyabeanus*, and *Colletotrichum lagenarium* was slightly depressed by zineb, $CuSO_4$, dichlone, and most of all by nabam. It was generally lowered by sulphydryl compounds and completely suppressed by cysteine and glutathione together, though they had a comparatively small effect separately. Labelled S^{35} and Zn^{65} in zineb were taken up more rapidly than Hg in PMA.

By means of the labelled zineb it was established that S^{35} tended to be translocated to the growing points of cucumber plants, while Zn^{65} applied to the roots of rice plants was concentrated in the root and basal foliage. Ethylene thiourea was found on the surface of leaves after the decomposition of zineb.

Hoffmann (E.) & Georgoussis (O.). **Phenylmercury compounds as fungicides.**—*J. Oil Col. Chem. Ass.*, **43**, 11, pp. 779–786, 1960.

Cases of [unspecified] mould growth on painted surfaces are sufficiently frequent in Australia to cause considerable expenditure on redecoration, and the trouble is

not invariably prevented by fungicidal treatment. The problem was investigated at Div. Build. Res., C.S.I.R.O., Melbourne, using a steam distillation method to measure the vapour pressures of phenyl Hg acetate, chloride, and nitrate and their solubilities in water, while the action on these compounds of atmospheric H_2S and S-containing pigments was also studied. The chemicals reacted with the latter, the reaction products being devoid of fungicidal properties, and it is essential, therefore, that the constituents of the paint should be analysed for an eventual reaction with phenyl Hg compounds before treatment.

Luijten (J. G. A.) & Van der Kerk (G. J. M.). **Investigations on organo-tin compounds. XIV. Preparation and antifungal properties of some triaryl- and triaralkyl-tin acetates.**

Noltes (J. G.), Luijten (J. G. A.), & Van Der Kerk (G. J. M.). **XV. The antifungal properties of some functionally substituted organo-tin compounds.**—*J. appl. Chem.*, **11**, 1, pp. 35–37; pp. 38–40, 1961.

Further studies in connexion with the agricultural applications of triphenyl Sn compounds [**40**. 276 and below] were concerned with the preparation and assay of these derivatives. None of them proved to be superior in antifungal activity to triphenyl-3-Sn acetate.

Of 35 functionally substituted organo-Sn compounds tested against *Botrytis allii*, *Penicillium italicum*, *Aspergillus niger*, and *Rhizopus nigricans* [*R. stolonifer*] only cyanomethyltri-n-butyl Sn, of the R_3Sn type, was appreciably toxic, its activity being attributed to the instability of the cyanomethyl-Sn bond to hydrolysis.

The introduction of functional substituents (especially water-solubilizing) into compounds of the R_3SnX type generally reduced fungitoxicity.

Rossi (G.) & Corradini (V.). **Nuova serie di composti organici aventi attività fungicida polivalente.** [New series of organic compounds having polyvalent fungicidal activity.]—*Chim. e Industr.*, **42**, 3, pp. 237–242, 1960.

At the Società Montecatini, Istituto Ricerche Linate, Milan, several compounds of the series $R_2N.CS.SCH_2O.COR'$ and $RO.CS.SCH_2O.COR'$, where R is the alkyl group and R' the CH_3 or C_6H_5, obtained by reaction between an alkaline diethyldithiocarbamate or an alkaline xanthogenate and chloromethyl esters (acetate and benzoate), proved to be highly fungicidal in laboratory tests. For instance, the growth of agar cultures of *Alternaria tenuis* and *Aspergillus niger* was inhibited by 0·04% $(CH_3)_2N{-}C(=S){-}S{-}CH_2{-}OCOC_6H_5$, placing it on a level with Na pentachlorophenate. The same compound at 0·025% was also effective against *Erysiphe cichoracearum* on tobacco plants, its action being equivalent to that of colloidal S, and against *Uromyces appendiculatus* on bean [*Phaseolus vulgaris*] at 0·05% (about the same as zineb). In another series of tests on vine leaves infected by *Plasmopara viticola* the activity of the chemical was equal to that of 0·0031% zineb, while $(C_2H_5)_2N{-}C(=S){-}S{-}CH_2{-}OCOC_6H_5$ gave comparable results at 0·0062%.

Geard (I. D.) & Allen (A. G.). **Soil sterilization.**—*Tasm. J. Agric.*, **31**, 4, pp. 407–421, 9 fig., 1960.

The principal methods of sterilization by steam or chemicals and their manner of application are outlined.

Lambe (R. C.). **The influence of temperature, moisture, and method of application on the fungitoxicity of mylone and vapam.** —*Diss. Abstr.*, **21**, 3, p. 418, 1960.

At Ore. State Coll. max. fungitoxicity of aqueous solutions of mylone and vapam [**39**, 379] was reached 12 hr. after drenching soil infested with microsclerotia of *Verticillium alboatrum*. Both fungicides were most active against *Phytophthora cinnamomi* and mylone against *V. alboatrum* at 25° C., the highest temp. tested, while vapam was most effective against the latter at 20°. A soil moisture content of 50% field capacity was opt. for both against *V. alboatrum* and of 100% against *P. cinnamomi*. Of the decomposition products of mylone, methylisothiocyanate was active against *V. alboatrum*, methylamine being non-toxic at the same conc.

Mushnikova (Mme K. S.). Протравители семян. [Seed disinfectants.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 2, pp. 33–37, 1961.

A useful brief review, with directions on use against particular diseases.

Major (R. T.), Marchini (P.), & Sproston (T.). **Isolation from Ginkgo biloba L. of an inhibitor of fungus growth.**—*J. biol. Chem.*, **235**, 11, pp. 3298–3299, 1960.

In joint studies by Cobb Chem. Lab., Univ. Va, Charlottesville, and Dept Bot., Univ. Vt, Burlington, α-hexenal was isolated from the products derived from the steam distillation of *G. biloba* leaves in the proportion of 75 p.p.m. Its occurrence is thought to account in part for the resistance of the tree to pests and diseases, the aldehyde being an inhibitor of fungi, with an ED_{50} of 300 p.p.m. for *Monilinia* [*Sclerotinia*] *fructicola*.

Curl (E. A.). **Microorganisms isolated from sclerotia of Sclerotium rolfsii and their antagonistic effects upon the pathogen.** —Abs. in *J. Ala. Acad. Sci.*, **30**, 2, pp. 3–4, 1958.

At the Ala Polytechnic Inst., Auburn, of the 35 fungi isolated from crushed sclerotia of *S. rolfsii*, *Cephalosporium* and *S. rolfsii* predominated: 13 bacteria and 15 actinomycetes were also obtained. Of the fungal isolates 55% inhibited *S. rolfsii* on Czapek-Dox agar, as did 21% of the actinomycetes and 33% of the bacteria. *S. rolfsii* inhibited the growth of 5 fungal isolates. Some of the isolates either stimulated or inhibited sclerotium production by the pathogen.

Moreau (C.). **Pollution fongique de l'atmosphère et altérations de denrées alimentaires.** [Fungal pollution of the atmosphere and spoilage of food products.]—*Bull. Froid Inform.* 54, pp. 7–9, 1961. [Cyclostyled.]

This further note [cf. **38**, 570] refers to the detection of spores of *Penicillium italicum* and *P. digitatum* in fruit-conditioning rooms near Paris and of *P. expansum* in apple stores. *Thielaviopsis* [*Ceratocystis*] *paradoxa* occurs in pineapple storage rooms, *Alternaria solani* in tomato stores, and *P. expansum* in sausage factories. In fruit stores air pollution is less at 2° [C.] than at 8° and may be reduced by lowering the R.H. 'Fogging' with the organic B derivative, albotene P 80, at 0·4 c.c./c.m. air is recommended; a space of 1,000 c.m. can be treated in under 10 min. Fungicidal paint (e.g. the organic borate albolit) on walls and ceiling is also effective.

Chiaverina (J.). **Papiers fongistatiques, papiers fongicides.** [Fungistatic papers, fungicidal papers.] **Boues et végétations dans les circuits.** [Slimes and growths in the circuits.]—*Bull. Ass. tech. Ind. papet., 1959*, 6, pp. 313–316, 3 fig.; pp. 305–312, 9 fig., 1959. [Germ., Engl., Span., Ital. summ.]

Directions are given for testing the efficiency of wrapping papers treated with antimicrobial substances to prevent the development of fungi or bacteria in food products. Samples are exposed to attack, e.g. by *Aspergillus niger*, *A. terreus*, or *Cladosporium herbarum*, on agar or other medium at 28° C. If the paper and a wide

surrounding zone remain free from invasion the product is considered fungicidal, but should the protected area be more or less limited to the site of inoculation, the material is merely fungistatic.

The life-cycles, development, and conditions promoting propagation of slime-forming micro-organisms, including *Aspergillus* and *Penicillium* spp., in paper mills are described. The need for thorough periodical cleansing is emphasized and the use of chemical preventives discussed. The relative efficacy of the latter can be determined only by means of microbiological counts. The principles and application of a procedure devised for this purpose are explained.

Pavlinova (Mme R. M.). **The use of antiseptics to increase the quality of paper and the output of the paper machine.**—*Pap. Industry, Moscow*, **34**, 8, pp. 10–11, 1959. [Russ. *Abstr. Bull. Inst. Pap. Chem.*, **31**, 4, No. 2152, 1960.]

At the Central Res. Inst. Pulp Pap. Ind., Moscow, 50 compounds were tested for efficiency in the prevention of slime formation [cf. **40**, 281]. The most bactericidal and fungicidal were ethyl $Hg_3(PO_4)_2$, C_2H_5HgCl-$C_6H_5HgOCOCH_3$, and fluorotripropyl tin, the toxic concs. for [unspecified] test organisms being 0·75–4·5 mg./l. of the 2 1st-named and 0·2–2·5 of the last. Among the remaining organic substances, Na and K 2,4,5-trichlorophenolate, Na-pentachlorophenol, and K trichloro $C_6H_5C_2H_3O_2$ were fungicidal at 35–50 mg. l. A 9:1 mixture of 2,4,5-trichlorophenolate and ethyl $Hg_3(PO_4)_2$ was fungitoxic at 5–7 mg. l. The ethyl Hg compounds are in use in several mills for slime control in recirculated white water. The introduction of antiseptics has considerably improved the quality of paper and increased the output of machines with a closed water system.

Nyuksha (Yu. P.). Систематический обзор грибов, обитающих на бумаге, книгах и в бумажной массе. [A systematic review of fungi inhabiting paper, books, and pulp.]—*Bot. Zh. S.S.S.R.*, **46**, 1, pp. 70–79, 1961. [Engl. summ. 39 ref.]

This survey [cf. **35**, 534] by the Saltykov Shchedrin State Public Library, Leningrad, U.S.S.R., based on studies by the author and by others, notes 266 spp. (105 gen.), including phycomycetes (13), ascomycetes (43), and fungi imperfecti (210), with descriptions of their physiological and ecological characteristics. The kind of material attacked, incidence, and damage caused are indicated.

Levin (M. S.). Служба защиты растений в Эстонии. [Plant protection service in Estonia.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 2, pp. 5–7, 1 fig., 1961.

A brief account of its organization and duties given by the Estonian Inst. Agric. Melioration.

Applied mycology.—*Ser. Philipp. sci. Bibliogr.* 1, 14+2 (unnumbered) pp., 1960.

In this bibliography from Div. of Documentation, nat. Inst. Sci. Tech., 727 Herran Str., Manila, 288 Philippine publications on fungi and their role in agriculture, medicine, and technology are listed under the main headings: Phytopathology, Mushroom Growing, Soil Microbiology, Infectious diseases (Mycoses), Pharmacology (Antibiotics), Industrial Microbiology, and Wood Preservation, together with an author index. Prices of photostats and microfilms are given.

Bärner (J.). **Bibliographie der Pflanzenschutzliteratur 1953.** [Bibliography of plant protection literature 1953.] –xli+527 pp., Berlin, Paul Parey, 1960. [Engl., Fr. introd., contents, and page headings.]

This instalment [cf. **39**, 152], comprising over 15,000 titles, is compiled on the usual lines.

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Disease reports (1–4) of the N. central regional plant introduction station.—Ames, Iowa, 1960.

These are the first of a series of reprints of papers (by E. E. Leppik) [**39**, 474, 484; **40**, 321, and *Bibliogr. syst. Mycol., 1961*, 1, 1961].

Palti (J.). **Problems of plant disease forecasting in an arid climate.**—*Plant Dis. Reptr*, **45**, 1, pp. 31–37, 1961. [15 ref.]

The author (Israel Min. of Agric.) discusses the climatic background of plant disease occurrence in arid climates, with reference to examples from Israel, and seasonal forecasting problems. During the rainless season pathogens requiring free moisture for development must rely on dew. Forecasts dependent on dew are likely to be unreliable. More knowledge is needed of the manner in which moisture-requiring pathogens survive dry periods and how they become sources of inoculum. Certain powdery mildews can tolerate both high and low humidity but their hosts only become infected at a particular stage of development; knowledge of these stages is necessary to forecast disease outbreaks. For those restricted to low humidity periods forecasting must take into account daytime R.H. as well as the phases of susceptibility of the host.

Gelcerová (Mme F. J.). **Význam endofytů v životě rostlin.** [The significance of endophytes in the life of plants.]—*Ann. Acad. tchécosl. Agric.*, **34**, 2, pp. 211–218, 1 pl. (4 fig.), 1961. [Russ., Germ., Engl. summ. 26 ref.]

The author (Moscow Dept All-Union Res. Inst. agric. Microbiol.) reviews studies on mycotrophy [cf. **39**, 548] and points out that (1) intensity is determined by hereditary and environmental factors; (2) the endophytes gain entry to the roots from germinating seeds as well as through vegetative propagating material such as cuttings; and (3) marked mycotrophy in mountain-grown potatoes is associated with their resistance and weak mycotrophy in lowland potatoes with their susceptibility to degeneration and viroses. Isolates are plated on acid nutrient media containing gibberellin or other growth-stimulating substances. In nutrient media endophytes [unspecified] produced coloured pigments and to some extent fixed atmospheric N.

Kambayashi (A.) & Nakatai (K.). **Basidiomycetes. I. Formation of oxalic acid.**—*Kogyo Gijutsuin, Hakko Kenkyusho Kenkyu Hokoku, 1960*, 18, pp. 87–100, 1960. [*Chem. Abstr.*, **54**, 22, col. 25033 g, 1960.]

Good growth of 76 strs. was obtained in shake cultures of a medium comprising 5% glucose, 2·5% maize steep liquor, 0·5% oryzanin powder (a commercial thiamine conc. derived from rice bran), and 0·2% KH_2PO_4. *Coniophora puteana*, *Corticium centrifugum*, *Daedalea quercina*, *Fomitopsis* [*Fomes*] *officinalis*, *F. pinicola*, *Laetiporus* [*Polyporus*] *sulphureus*, *Piptoporus* [*Polyporus*] *betulinus*, *P*[*olyporus*] *palustris*, and *Poria vaporaria* were selected for their copious acid production. All were shown by paper-chromatography to yield only oxalic acid as the non-volatile component. *Coniophora puteana*, *F. officinalis*, *D. quercina*, and *Polyporus palustris* were also examined by gas chromatography.

Chen (Y.-S.). **Studies on the metabolic products of Rosellinia necatrix. I. Isolation and characterization of several physiologically active neutral substances.**—*Bull. agric. chem. Soc. Japan*, **24**, pp. 372–381, 1960. [*Chem. Abstr.*, **55**, 1, col. 680 d, 1961.]

Three dioxopiperazines isolated at Univ. Tokyo from the neutral fraction of the culture broth extract of *R. necatrix* inhibited the growth of rice seedling roots and leaves at 1:2,500–1:100,000, and were identified.

Deshpande (K. B.). **Pectolytic enzyme system of Rhizoctonia solani: properties of protopectinase.**—*Biol. Plant Acad. Sci. Bohemoslov.*, **2**, pp. 139–151, 1960. [Engl. *Chem. Abstr.*, **55**, 1, col. 699 d, 1961.]

At Imp. Coll., London, protopectinase produced by *R.* [*Corticium*] *solani* killed the cells of potato tuber and swede root tissues before maceration was complete. Dilution with water and with autoclaved enzyme solution reduced macerating activity less than toxicity, thereby indicating that other toxins besides enzymes were present in culture filtrates. The properties of the enzyme are detailed.

Gäumann (E.), Naef-Roth (St[ephi]), & Kern (H.). **Zur phytotoxischen Wirksamkeit der Enniatine.** [On the phytotoxic activity of the enniatins.]—*Phytopath. Z.*, **40**, 1, pp. 45–52, 2 graphs, 1960. [Engl. summ.]

Studies at Eidg. Techn. Hochschule, Zürich, showed baccatin A, a metabolic product of *Gibberella baccata* [**39**, 246], to consist of a mixture of enniatins [**32**, 270] A and B, which proved difficult to separate. The phytotoxic activity of the mixture increases synergistically: against tomatoes and algae the toxicity of A+B (37·5: 62·5) was 2–3 times greater than the toxicity of either alone.

De Waart (C.) & Taber (W. A.). **Some aspects of phosphate metabolism of Claviceps purpurea (Fr.) Tul.**—*Canad. J. Microbiol.*, **6**, 6, pp. 675–678, 4 graphs, 1960. [13 ref.]

At the Prairie Regional Lab., Saskatoon, alkaloid synthesis by *C. purpurea* [**39**, 672 and below] required a lower conc. of orthophosphate than that needed for max. growth. Growth continued for 3 weeks after inorganic phosphate had disappeared from the medium, so nucleic acid phosphate probably functioned as a reserve.

Brady (L. R.) & Tyler (V. E.). **Alkaloid accumulation in 2 clavine-producing strains of Claviceps.**—*Lloydia*, **23**, 1, pp. 8–20, 4 graphs, 1960. [21 ref.]

At the Drug Plant Lab., Coll. Pharm., Univ. Wash., Seattle, *C.* str. 47 A accumulated more alkaloids [cf. **39**, 697 and above] in media with added sucrose and DL-phenylalanine, and with low concs. of PO_4. The other str., 15 B, accumulated more alkaloids in the control medium. It is possible that these substances act as anti-metabolites in some of these strs. of *C.*

Peterson (E. A.). **Observations on the influence of plant illumination on the fungal flora of roots.**—*Canad. J. Microbiol.*, **7**, 1, pp. 1–6, 1 pl., 1961. [12 ref.]

In the greenhouse and plant growth room at the Microbiol. Res. Inst., Canada Dept Agric., Ottawa [cf. **37**, 762], shading had no appreciable effect on fungi which colonized the primary roots of wheat and soybeans in fertile, disease-free soil. The saprophytic fungi normally associated with healthy plants were able to colonize abnormal ones grown at low light intensity if the soil was free from pathogens.

Phoma spp. predominated among the wheat root isolates and *Fusarium* spp. among those from soybean.

Di Menna (M[argaret] E.). **Yeasts from soils under forest and under pasture.**—*N.Z.J. agric. Res.*, **3**, 4, pp. 623–632, 1960. [12 ref.]

In further work at D.S.I.R., Wellington [cf. **39**, 675], 2 kinds of change were noted in the yeast flora of the soil when native forest was replaced by introduced pasture. A yellow-brown loam under forest contained little *Candida curvata*; under pasture there was more but the population was dominated by *Cryptococcus terreus*. In a recent gley soil under forest *Candida curvata* was dominant but *Hansenula* spp. were present in large numbers; in the same soil under pasture yeast numbers were lower, *H.* spp. being absent and *C. curvata* the only dominant.

Thornton (R. H.). **Fungi of some forest and pasture soils.**—*N.Z.J. agric. Res.*, **3**, 4, pp. 699–711, 1960. [26 ref.]

In examination at D.S.I.R., Taita, N.Z., of 2 soils under forest and 5 under pasture [cf. above] by the screened immersion plate method [cf. **39**, 675] greater numbers of mycelia were isolated from soils under pasture than from the same soils under forest, and from well-drained soils under pasture than from less well-drained. Under forest *Cylindrocarpon radicicola* predominated, whereas under pasture *F.* spp., absent under forest, predominated, especially *F. oxysporum*.

Nestorescu (E.) & Eliade (G.). **Cercetări privind folosirea extractului de sol ca mediu de cultură pentru studiul microflorei totale a solului.** [Investigations of the use of soil extract as a culture medium for the study of the total soil microflora.]—*Comun. Bot., București, 1957–1959*, pp. 259–262, 2 fig., 1 graph, 1960. [Russ., Engl. summ.]

The soil extract used was a modification of that used by A. Lochhead (*Soil Sci.*, **55**, pp. 185–195, 1943; Sixième congrès de la science du sol. Vol. C, Comiss. III, Paris, p. 157, 1956). Equal parts of soil and water, filtered, adjusted for pH, filtered again through a Seitz filter, and mixed at 3:1 with 8% agar sol. cooled to 40° [C.] after autoclaving gave an extract which proved more reliable as a culture medium than other substrates normally used [cf. **39**, 88], particularly for the study of qualitative-quantitative relations of the isolates, since it is more like the actual soil.

Gams (W.). **Winterliches Pilzwachstum im Boden.** [Winter growth of fungi in soil.] **Studium zellulolytischer Bodenpilze mit Hilfe der Zellophanstreifen-Methode und mit Carboxymethyl-Zellulose.** [A study of cellulolytic soil fungi with the cellophane strip method and with carboxymethyl cellulose.]—*Sydowia*, **14**, 1–6, pp. 288–294; 295–307, 4 fig., 1960. [Engl. summ. 40 ref.]

In further experiments by the Bodenbiologisches Inst. der forstlichen Bundes-Versuchsanstalt, Mariabrunn, Austria [cf. **39**, 390], *Mortierella* spp. and some other fungi were obtained from nylon strips buried under the frozen surface of soil in a pine forest and are thus considered to be active even in winter.

On buried cellophane 'rooting branches' of cellulolytic fungi as described by Tribe [**37**, 703] developed, also on strips on nutrient agar. The use of double and triple layers facilitated isolation. Under a polarization microscope the rooting branches often appeared to follow the direction of the cellulose fibrils.

Fungi known to be cellulolytic and some normally sterile forms decomposed carboxymethyl cellulose (CMC) readily, and more intensely if it was supplemented by yeast extract, trace elements, or small quantities of sugar. CMC also stimulated sporulation in several otherwise sterile forms. This use of CMC can indicate the production of the enzyme C_x (1–4 β polyglucosidase) only, and not also of C_1, which is necessary for decomposing natural crystalline cellulose. This view is supported by the fact that fungi producing only C_x, such as *Aspergillus repens*, *A. niger*, *Mortierella ramanniana* [*Mucor ramannianus*], and *M. vinacea*, utilized cellophane readily.

Nadakavukaren (M. J.). **The effect of soil moisture and temperature on survival of Verticillium microsclerotia.**—*Diss. Abstr.*, **21**, 3, p. 419, 1960.

In assays of *V. alboatrum* in artificially infested field soil at Ore. State Coll. [**39**, 157] survival was greatest at 5–15° C. and 50–75% field moisture capacity. At 30° microsclerotia survived 12 days–6 months, and at 40° 3–35 days, depending on the water content. In flooded soil the microsclerotial population was rapidly reduced at all temps. Addition of moisture to air-dry soil caused an immediate increase in

population counts, probably as a result of physical factors rather than of reproduction by the fungus.

Ward (E. W. B.) & Henry (A. W.). **Comparative response of 2 saprophytic and 2 plant parasitic soil fungi to temperature, pH, and nutritional factors.**—*Canad. J. Bot.*, **39**, 1, pp. 65–79, 2 graphs, 1961. [33 ref.]

At Univ. Alta, Edmonton, the opt. temps. for growth on an organic agar medium were 25–30° C. for *Trichoderma viride*, 20–25° for *Trichocladium asperum* and *Ophiobolus graminis*, and 25° for *Fomes annosus*. *Trichoderma viride* was the only one able to grow at 35°; it also outgrew the others in the opt. temp. range, but was equalled by *O. graminis* at 10°. Growth of *O. graminis* and *F. annosus* was markedly reduced below pH 5, while *T. viride* grew well at 3·1 and *Trichocladium asperum* at 4 or above. Both *O. graminis* and *F. annosus* required thiamine (the former biotin also) and utilized organic N rather than inorganic. No vitamins were required by the 2 saprophytes, which grew well with KNO_3. All utilized D-glucose, D-fructose, and D-mannose, but D-arabinose less readily. Utilization of other carbohydrates varied.

Boosalis (M. G.) & Scharen (A. L.). **The susceptibility of Pigweed to Rhizoctonia solani in irrigated fields of Western Nebraska.**—*Plant Dis. Reptr*, **44**, 11, pp. 815–818, 1960.

In further work [**38**, 465] at Dept Plant Path., Univ. Neb., Lincoln, 15 physiologic races of *R.* [*Corticium*] *solani* were isolated from *Amaranthus retroflexus*, but in greenhouse tests some of these races were non-pathogenic to bean [*Phaseolus vulgaris*], sugar beet, lucerne, or potato. Most of the races from naturally infected *A. retroflexus* were isolated from diseased tissue buried for 1 yr. in soil.

Johnson (D.) & Aas (K.). **Investigations of the technique of soil steaming.**—*Acta agric. scand., Suppl.* 9, 69 pp., 5 fig., 14 diag., 29 graphs, 1 plan, 1960.

These extensive experiments on thermal conditions in soil during steaming were made during 1952–56 at the Inst. of Thermodynamics, Technical Univ., Norway, to examine certain theoretical and practical aspects, including equipment.

Кочев (Кн.). Хлорозата по дървесната растителност в Дунавската равнина. [Chlorosis of trees in the Danube plain.]—*Bull. Inst. bot., Sofia, 1960*, 7, pp. 37–105, 11 fig., 2 diag., 2 maps, 1960. [Russ., Germ. summ. 58 ref.]

This type of disorder affects many tree spp. [listed], predominantly those of economic importance, and is most widespread in a zone along the Danube. It was shown to be related to excess $CaCO_3$ (pH 7·8–8·82) and deficiency of Fe salts. Experimental spraying of chlorotic leaves with $FeSO_4$ and $FeCl_3$ sol. resulted in a revival of the normal green colour. Application of $FeSO_4$ and organic fertilizers to the roots of fruit trees and vine in early spring is recommended.

Dadant (R.), Rasolofo (Mme). & Baudin (P.). **Liste des maladies des plantes cultivées à Madagascar.** [List of the diseases of cultivated plants in Madagascar.] –94 pp., Institut de la Recherche Agronomique de Madagascar, 1960. [109 ref. Cyclostyled.]

This list (to be supplemented annually) is compiled from past and recent records [cf. **27**, 79; **40**, 272], with a ref. to each of these and a brief note on prevalence, damage caused, and control. The diseases are listed in descending order of importance under hosts (by common names alphabetically). A parasite index is appended. Attention is drawn to the absence of certain widespread diseases, serious elsewhere, including potato blight (*Phytophthora infestans*), Panama disease (*Fusarium oxysporum* var. [f.] *cubense*) on banana, and *Ophiobolus* [*Cochliobolus sativus*] on rice.

VASUDEVA (R. S.). **Common names of Indian plant diseases.**—*Bull. Indian Coun. agric. Res.* 78, 50 pp., 1960. 1*s.* 6*d.*

In this similarly arranged revision of the previous list [cf. **30**, 620] 457 economic hosts are listed with the fungi, bacteria, and viruses attacking them.

CHRISTIANSEN (M. P.). **Danish resupinate fungi. Part II. Homobasidiomycetes.**—*Dansk. bot. Ark.*, **19**, 2, pp. 57–388, 326 fig., 1960. [197 ref.]

This very exhaustive work deals with a further 35 gen. [cf. **39**, 284] and concludes with an index to the gen. and spp. in both parts.

LENTZ (P. L.). **Taxonomy of Stereum and allied genera.**—*Sydowia*, **14**, 1–6, pp. 116–135, 1 pl., 1960. [35 ref.]

In this further contribution [cf. **36**, 63] *Stereum*, *Peniophora*, and 9 related gen. are re-evaluated in the light of recent work, with a provisional key.

SUNDSTRÖM (K. R.). **Physiological and morphological studies of some spp. belonging to the genus Exobasidium.**—*Phytopath. Z.*, **40**, 2, pp. 213–217, 1960. [Germ. summ.]

E. vaccinii isolated from *Vaccinium vitisidaea*, *V. uliginosum*, *V. oxycoccus* [*Oxycoccus palustris*] and *Arctostaphylos uva-ursi*, *E. karstenii* from *Andromeda polifolia*, *E. angustisporum* from *Arctostaphylos* [*Arctotus*] *alpina*, *E. cassiopes* from *Cassiope tetragona*, and *E. myrtilli* from *V. vitis-idaea* and *V. myrtillus* were studied at Inst. Physiological Bot., Uppsala Univ., Sweden, in an attempt to clarify the taxonomy of the genus. The ability to utilize different C sources and synthesize vitamin B_1 and its components is almost identical in isolates of the same sp. isolated from the same host, but differences may occur between isolates from different hosts. Growth for all was opt. at pH 3–5 and 19–25° C. for *E. vaccinii* and *E. karstenii*, but at 14–19° for *E. myrtilli*, *E. cassiopes* and *E. angustisporum*. One strikingly constant morphological character is the manner of germination of the basidiospores [cf. **40**, 112] on different kinds of agar medium: in *E. vaccinii*, *E. karstenii*, and *E. angustisporum* short germ tubes bearing conidia are produced, but in *E. myrtilli* and *E. cassiopes* the branched mycelium bears few conidia. A cysteine conc. of 10^{-2} M can transform *E. myrtilli* from the mycelial into the conidial form.

DRECHSLER (C.). **Two root-rot fungi closely related to Pythium ultimum.**—*Sydowia*, **14**, 1–6, pp. 106–115, 5 pl., 1960.

Descriptions are given of the new var. *P. ultimum* var. *sporangiferum* collected on roots of *Chenopodium album* in Aug. 1955 at Beltsville, Md, and of *P. violae* [**23**, 343] isolated from diseased roots and stems of pansies in May 1938 at Washington, D.C. The former differs from the species in that it is common at high midsummer temp., in the ready production of zoospores [cf. **29**, 309], slightly slower growth, and slower after-ripening of the oospores.

KARLING (J. S.). **Inoculation experiments with Synchytrium macrosporum.**—*Sydowia*, **14**, 1–6, pp. 138–169, 1 pl., 1960.

More detailed information [**40**, 30] is given of inoculation with *S. macrosporum* which infected 707 plant spp. (610 new hosts) but failed to infect fungi, algae, liverworts, mosses, or ferns. The most susceptible families were Cruciferae, Leguminosae, Cucurbitaceae, Solanaceae, and Compositae. Some inconsistencies in results were obtained, possibly owing to variation in sexuality of the inoculum. The author's observations suggest the possible identity of *S. macrosporum* with *S. aureum* and also possibly with a number of *S.* spp. described from Louisiana [**33**, 118].

Nukumizu (T.), Ando (M.), & Dozono (Y.). **On the production and morphological characters of fruit bodies of hybrid F, of 'Shiitake', Cortinellus edodes (Berk.) S. Ito et Imai.**—*Bull. For. Exp. Sta. Meguro* 125, pp. 57–65, 8 graphs, 1960. [Jap. Abs. from Engl. summ.]

At the Lab. For. Mycol., Zingu-machi, Miyazaki-shi, Japan, monospore isolates of 3 local strs. of *C. edodes* [**37**. 629] were paired and the resulting diploid mycelium cultured on logs of *Quercus serrata*. A comparison of F_1 fruitbodies indicated that the parent strs. might be hybrids. The activities of some multiple genes were traced in genetical analyses.

Rautenshteĭn (Ya. I.) (Editor). Биология отдельных групп Актиномицетов — продуцентов антибиотиков. [The biology of individual groups of Actinomycetes producing antibiotics.]—Труд. Инст. Микробиол. [*Trud. Inst. Mikrobiol.*], **8**. 346 pp., illus., Moscow, Acad. Sci. U.S.S.R., 1960. Roubles 21.45.

This collection of 20 papers includes 2 by N. A. Krasil'nikov (pp. 7–20, 21–28), 'On the principles for the classification of Actinomycetes' and 'On the rules for the classification of Actinomycetes producing antibiotic substances' [**38**, 497], and a contribution by Ya. I. Rautenshteĭn (pp. 29–44) 'On the use of actinophages in the identification of Actinomycetes'.

Acha (Isabel G.) & Villanueva (J. R.). **A selective medium for the formation of ascospores by Aspergillus nidulans.**—*Nature, Lond.*, **189**, 4761, p. 328, 1961.

The medium, developed at the Inst. 'Jaime Ferran' de Microbiol., Velazquez 138, Madrid, and yielding ascospores without interference from conidiospores, consisted of urea or ammonium oxalate (3 g.), K_2HPO_4 (1 g.), $MgSO_4$ (0·5 g.), KCl (0·5 g.), $FeSO_4$ (0·05 g.), sucrose (30 g.), agar (15 g.), + water (1 l.). Cultures developed perithecia within or on the conidial layer with a dark reddish-purple hyphal covering. Large numbers of purple-red lenticular ascospores with 2 equatorial crests and comparatively few conidia were produced. The intense purple pigmentation extended throughout the medium. On Czapek's agar this str. of *A. nidulans* produced colonies with abundant conidial heads and few perithecia.

Valenta (V.). **Some experiences in maintaining yellows-type viruses.**—*Tijdschr. PlZiekt.*, **66**, 4, pp. 264–267, 1960. [Dutch summ.]

At the Inst. of Virology, Bratislava, Czechoslovakia, *Nicotiana glauca* proved the most suitable host for cultures of the viruses of [tomato] stolbur, various types of potato witches' broom [**40**, 268], and Crimean yellows [**38**, 680; **39**, 562]. For work involving leafhopper transmissions white clover was best.

Bhargava (K. S.) & Joshi (R. D.). **A distinctive strain of Cabbage black ringspot virus from some ornamental plants.** *Phytopath. Z.*, **40**, 2, pp. 109–116, 8 fig., 1960. [Germ. summ.]

At the Dept Bot., Gorakhpur Univ., U.P., India, a virus infecting *Iberis umbellata*, *Matthiola incana*, and *Hesperis matronalis* in 1958–9 in Naini Tal, was classified in the turnip virus 1 [mosaic virus] group [**40**, 11]. It broadly resembled cabbage black ring spot virus [cf. **36**, 801; **38**, 678] in its physical properties and host range, but was distinct in producing only local lesions on cabbage, cauliflower, and Brussels sprouts, symptomless local infection in *Nicotiana glutinosa* and *N. rustica*, and symptomless systemic infection in *Petunia hybrida*.

De Robertis (A.). **Aspetti fitopatologici delle concimazioni azotate. Esperienze ed osservazioni sulla recessione sintomatica della fenomenologia di alcune virosi (Marmor virgatum McK ; Marmor tulipae Holmes).** [Phytopathological aspects

of the application of nitrogenous fertilizers. Experiments and observations on the reduction of the symptoms of certain virus diseases (Wheat streak mosaic virus and Tulip breaking virus).] — *Terra pugliese*, **8**, 2, pp. 25–30, 3 fig., 1959. [Received Jan. 1961.]

In this paper (reprinted from *Atti Conv. Concimazione azot., Bari*, 18–19 Sept. 1957) the author, after noting that experimental evidence demonstrated that N applications reduced symptoms of wheat streak mosaic virus, describes experiments in 1952–56 in which N applications led to the disappearance of symptoms of tulip breaking virus from Rembrandt tulips.

Miličić (D.) & Udjbinac (Zlata). **Die Eiweißkristalle von Capsicum annuum sind Viruskörper.** [The protein crystals of *C. annuum* are virus bodies.] — *Protoplasma*, **52**, 3, pp. 446–456, 3 fig., 1960. [33 ref.]

It was demonstrated by observations on living fruits of var. Kalinkova at the Botanisches Institut, Zagreb, Yugoslavia, that the protein crystals detected by Nestler (*S.B. Wien. Akad. Wiss.*, Math.-Naturw. Kl., Abt. I, **115**, p. 477, 1906) in dried material of this plant were not normal inclusion bodies of regular occurrence. Among about 100 fruits only a few contained crystals and they were infected by tobacco mosaic virus. It is concluded that the Nestler's bodies were also of virus origin, especially as they agree with those of tobacco mosaic in shape, distribution in the tissues, and reaction to stains.

Host list of fungi etc. recorded in the South East Asia and Pacific Region. Theobroma cacao—Cacao.—*Tech. Docum. F.A.O. Plant Prot. Comm. S.E. Asia* 11, pp. 1–2, 1961. [Cyclostyled.]

A further list (FAO Regional Office, Bangkok, Thailand) [cf. **39**, 733]. The fungus spp., common names of the diseases, and areas of reported occurrence are listed.

Pedersen (P. M.) & Jorgensen (J.). **Knækkefodsygens og goldfodsygens afhængighed af sædskifte og andre dyrkningsfaktorer.** [The dependence of eyespot and take-all on crop rotation and other cultural factors.]—*Tidsskr. Planteavl*, **64**, 3, pp. 369–416, 3 graphs, 3 maps, 1960. [Engl. summ., 17 ref.]

In samples of 200 straws each, taken in 1955–57 from 447 wheat and 73 barley fields on the islands of Zealand and Falster, Denmark, *Cercosporella herpotrichoides* was almost ubiquitous, *Ophiobolus graminis* occurred in about 25% and *Rhizoctonia* [*Corticium*] *solani* (in 1957 only) in 63% of 51 fields. Average infection by *O. graminis* during the period ranged from 0·34%, while that of eye-spot was 20% in the 1st yr. and 40 in the 2 following and of sharp eyespot [*C. solani*] in 1 yr. 2·5%.

Factors contributing to the increase of eyespot included early sowing, heavy tillering of the wheat in the autumn, and early applications of N. A tendency to reduction occurred in crops given abundant P and K. The number of previous barley-free years in the rotation was of major importance in the development of eyespot and take-all. An increase in the number of barley-free years preceding wheat resulted in a gradual decrease of the former, whereas a fairly high reduction of take-all occurred in the 2 barley-free years before wheat. Thus, take-all appears to be starved out more rapidly than eyespot. Wheat was more severely attacked by *C. herpotrichoides* than barley, while the reverse was true for *O. graminis*, which increased successively from the 1st- to the 3rd-yr. barley crop, during which time eyespot waned slightly. There was no difference between leguminous crops on the one hand, and roots, potatoes, and rye grass [*Lolium perenne*] on the other, in respect of their influence on the development of the 2 diseases in succeeding wheat crops, but in the rotation barley–grass-grass–oats–wheat both were less severe than in barley–grass–oats–wheat.

Machacek (J. E.) & Wallace (H. A. H.). **Co-operative seed treatment trials—1960.**—*Canad. Pl. Dis. Surv.*, **40**, 2, pp. 49–53, 1960.

Of 20 products tested at the Canada Dept Agric., Winnipeg [cf. **39**, 686], all except 5 reduced wheat bunt (*Tilletia foetida*, *T. caries*) from 22·3% (untreated) to 0·3% or less, but only aagrunol VTF 100 RCE (34% heptachlor + 1% Hg as methyl Hg benzoate) and pandrinox (24·4% heptachlor + 0·5% Hg as methyl Hg dicyandiamide) reduced oat smuts (*Ustilago avenae*, *U. kolleri* [*U. hordei*]) to less than 2% (untreated 13%), and only 7 reduced barley smut (*U. hordei*) to less than 1·5% (untreated 6·4%). Of these, aagrunol and puradrin XL were severely toxic to wheat.

Moreau (Mireille) & Moreau (C.). **Recherches sur la sporulation de l'Aspergillus clavatus.** [Studies on the sporulation of *A. clavatus*.]—*C.R. Acad. Sci., Paris*, **251**, 15, pp. 1556–1557, 1960.

The potential danger of the high toxicity to livestock of fodder obtained from cereals contaminated in the seed-bed by *Aspergillus clavatus* is increased by the very high infective potential, a single spore producing 50,000,000 in 4 days in cultures 16 mm. diam. and 5 times as many in 6 (24 mm.).

Mkhitaryan (M. A.). Опыт получения ржавчиноустойчивых сортов Пшеницы в Армении. [An experiment in the development of rust-resistant Wheat varieties in Armenia.]—Изв. Акад. Наук Армян. ССР [*Izv. Akad. Nauk Armyan. S.S.R.*], biol., agric. Sci., **13**, 8, pp. 35–44, 1960. [Arm. summ.]

At the Inst. Agric., Armenian S.S.R., the performance of the following vars. was assessed. Ozvar (Erythrospermum, developed by converting winter into summer wheat) has a high yield and is comparatively resistant to rust [*Puccinia* spp.: **40**, 95] when sown early (mid-April); Martuk (Erythrospermum, from the winter var. Ukraïnka by change of cultivation zone, sowing time, and repeated selection) is comparatively resistant and can replace Ukraïnka, and in some places, Kamir salfaat, though it is not so prolific in yield as the latter; Altuk (Altŷ-agach × Ukraïnka) is only slightly susceptible, has a high yield, and ripens 3–4 days earlier than the standard vars.

Shopina (Mme V. V.). Расовый состав бурой ржавчины Пшеницы в стране. [Racial distribution of brown rust of Wheat in the U.S.S.R.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 11, pp. 34–36, 1 map, 1960.

According to investigations by All-Union Inst. Plant Prot., races 5, 6, 21, 27, 42, 48, 60, 65, 80, 82, 83, 91, 99, 101, 112, 113, 115, 116, 119, 120, 129, 145, 146, and 157 of *Puccinia triticina* [*P. recondita*: cf. **38**, 505; **40**, 96] are present in the U.S.S.R. Of these some are geographically restricted, e.g. 129 to the Dnepropetrovsk area and 157 to Armenia. The type of infection by some races (e.g. 77 and 113) differed with the place of origin and or, in the case of infection with monospore clones, according to the biotype (e.g. 77, 116, and 145), these differences, however, largely appearing only on slightly susceptible and resistant vars., such as Erythrospermum 1613, Hordeiforme 10, Lutescens 1655, and Erythrospermum 1585. On the last two the virulence of some races (e.g. 6 and 80) increased by repeated transfers.

Khovanskaya (Mme K. N.). Значение удобрений в борьбе с бурой ржавчиной яровой Пшеницы. [The importance of fertilizers in the control of brown rust of summer Wheat.]—Бюлл. н.-т. Инф. рм. Льгов. опыт.-селек. Ст. [*Byull. n.-t. Inform. L'gov. opŷt.-selek. St.*], *1959*, 2, pp. 73–75, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 19, p. 165, 1960.]

The development of brown rust [*Puccinia recondita*: **39**, 654] on the susceptible

summer wheat Lutescens 62 in an annual grass-garden beet rotation in the Kursk region was studied under different doses of fertilizer. Max. reduction of infection and increase in yield was obtained with a double dose of NPK (30, 44, and 30 kg./ha.); applied singly P, and especially K, increased resistance.

Parfilova (Mme M. E.). Материалы по бурой и желтой ржавчине Пшеницы в условиях Львовской области. [Data on brown and yellow rust of Wheat in the L'vov region.]—Науч. Зап. Львов. сел.-хоз. Инст. [*Nauch. Zap. L'vov. sel.-khoz. Inst.*], *1959*, 8, pp. 9–16, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 19, p. 165, 1960.]

Severe damage is caused each yr. by *Puccinia triticina* [*P. recondita*: **40**, 295], and sometimes by *P. glumarum* [*P. striiformis*]. Control measures are recommended.

Wienhues-Ohlendorf (A.). **Die Ertragsleistung rostresistenter 44- und 42-chromosomiger Weizenquecken-Bastarde.** [The yield of rust resistant Wheat–Couch Grass hybrids with 44 and 42 chromosomes.]—*Züchter*, **30**, 5, pp. 194–202, 7 graphs, 1960.

Wheat-couch grass hybrids, in which the chromosome of *Agropyron intermedium* [**35**, 758] resistant to brown [*Puccinia recondita*: cf. **40**, 97] and yellow rust [*P. striiformis*] was incorporated, were compared for yield with genetically similar material minus the *Agropyron* chromosome at the Max Planck Inst. für Züchtungsforschung, Köln-Vogelsang, Germany. The *A.* chromosome reduces the vitality of the plant (poorer germination, slower development, fewer stems), but this is favourably compensated for by a greater development of the grain. The compatibility of the parents can play an important part. Some 44-chromosome lines exceeded the standard in yield. The effect of the *A.* chromosome on yield seems more favourable when the chromosome arm with resistance to *P. striiformis* is left out.

Kendrick (E. L.) & Holton (C. S.). **Racial population dynamics in Tilletia caries and T. foetida as influenced by Wheat varietal populations in the Pacific Northwest.**—*Plant Dis. Reptr*, **45**, 1, pp. 5–9, 1961. [15 ref.]

A review by the agric. Exp. Sta., Pullman, Wash., of such populations in 5 significant periods from 1900–60 shows how in each period release of a resistant var. was soon followed by the appearance of a new smut str. to which it was susceptible, and thus the law of racial dynamics has served to perpetuate the smut problem in the area.

Johnson (R. M.). **Evaluation of five rapid methods for determining smut content of Wheat.**—*Diss. Abstr.*, **21**, 3, p. 417, 1960.

At Univ. Md it was concluded that the most practical method for routine tests of bulk wheat for total smut [*Tilletia* and *Ustilago*] content is the light absorption technique, which takes only 45 sec. determination. The sedimentation method, used to differentiate between smut and other types of mould contamination, is the cheapest.

Mitov (N.). Въпросът за праховитата главня по Пшеницата у нас и пътища за неговото практическо разрешаване. [The problem of Wheat loose smut in Bulgaria and means towards a practical solution.]—Селскост. Мисъл. [*Selskost. Misŭl.*], **4**, 1, pp. 53–62, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 18, p. 174, 1960.]

At the Inst. for Plant Protect., Sofia, winter sowing of spring wheat somewhat reduced the percentage of plants infected by *Ustilago tritici* [*U. nuda*: cf. **39**, 100], though after the mild winter of 1954–5 the number in winter sowings was almost

the same as in spring sowings. Spore inoculation of 24 Bulgarian and foreign wheat vars. with inoculum from 30 places in Bulgaria indicated that resistance of a var. was not always the same, which suggests specialized races with limited areas of distribution. When 7 soft winter wheat vars. and barley and rye were inoculated with a mixture of spores from 30 regions, infection in 2 indicated that barley and wheat smuts may be identical, or at least that races common to both barley and wheat exist.

Spalding (D. H.). **Mechanisms of the stripe pathogen, Cephalosporium gramineum, in killing cultivated Wheat.**—*Diss. Abstr.*, **21**, 3, p. 421, 1960.

At Wash. State Univ. *C. gramineum* [**40**, 297], grown in a mineral medium with sucrose as the C source, produced a polysaccharide which, on hydrolysis, yielded glucose, mannose, and rhamnose.

Kernels of infected plants were smaller than normal and had a higher N:carbohydrate ratio. Striped tissue contained less moisture than healthy and failed to take up dyes, nor were dyes able to diffuse laterally from functional veins into apparently healthy green tissue bordering the stripes.

Heated and unheated filtrates from cultures of *C. gramineum* wilted excised tomato and wheat plants. This activity was associated with the polysaccharide fraction. Some striped wheat plants contained a polygalacturonase, the amount depending on var. susceptibility.

It is suggested that infected wheat plants are killed by the polysaccharide, which increases the viscosity of the transpiration stream, resulting in plugging of some vessels. This effect is increased by the presence of fungal elements and pectin plugs produced from host tissues by fungal pectinolytic action.

Nakagawa (M.), Soga (Y.), Watanabe (S.), Gocho (H.), Nishio (K.), & Kurata (H.). **Practical utilization of genetical studies on the resistance to Gibberella saubinetii on Wheat.** –*Bull. 1st Agron. Div. Tôkai-Kinki agric. Exp. Sta.* 6, pp. 47–67, 3 fig., 1959. [Jap. Abs. from Engl. summ.]

Strs. with resistance to ear scab (*G. saubinetii*) [*G. zeae*: **40**, 218] were obtained from the wheat crosses Wichita / Shinchunaga, Norin 26 / Shinchunaga, and Norin 50 × Shinchunaga. The experimental data are tabulated.

Inoue (Y.) & Nagae (S.). **Investigations on the fungicidal spray controlling scab of Wheat. I. Selection of preventive fungicides.** – *Bull. 1st Agron. Div., Tôkai-Kinki agric. Exp. Sta.* 6, pp. 168–181, 5 graphs, 1959. [Jap. Abs. from Engl. summ.]

In spraying trials from 1954 the yield of wheat infected by scab [*Gibberella zeae*: see above] was increased by 66–77% and disease incidence reduced 80–90% by pomarsol forte and phygon, compared with 20% and 40%, respectively, by lime-sulphur, the standard treatment. Spraying is uneconomic on crops with less than 50% ear or 20% spikelet infection.

Rochow (W. F.). **Transmission of Barley yellow dwarf virus acquired from liquid extracts by aphids feeding through membranes.**—*Virology*, **12**, 2, pp. 223–232, 1 fig., 1 graph, 1960. [15 ref.]

In further studies at Cornell Univ., Ithaca, N.Y. [**40**, 219], *Macrosiphum granarium* [*M. avenae*] when confined in a feeding chamber topped with an animal membrane penetrated the membrane to feed on liquid plant extracts containing added sucrose. When non-viruliferous aphids were allowed to feed through the membrane for 16–18 hr. at 15° C. on extracts from oats infected by barley yellow dwarf virus and were then transferred to oat plants (10 aphids/plant) for 3 days they readily transmitted the str. normally transmitted by *M. granarium*.

Transmission occurred in all of over 70 tests made on extracts of frozen stems of infected oats. The dilution end-point in clarified extracts was 1 : 1,000–10,000 when distilled water was the diluent and when sucrose was added before testing.

LAMBERS (D. H. R.). **The identity and name of a vector of Barley yellow dwarf virus.**—*Virology*, **12**, 3, pp. 487–488, 1960.

The names *Rhopalosiphum prunifolii* [**36**, 238; **37**, 35, *et passim*] and *R. fitchii* [**38**, 682; **40**, 41, 219, *et passim*], frequently used in N. America for vectors of barley yellow dwarf virus, should be replaced by *R. insertum* and *R. padi* [**38**, 511, *et passim*], respectively, as used in Europe. *R. insertum* is not likely to be important as a vector of viruses, the production of virginoparous alatae being very small.

WALLACE (H. A. H.). **Yellow dwarf of Barley and red leaf of Oats in Manitoba in 1960.**—*Canad. Pl. Dis. Surv.*, **40**, 2, pp. 63–64, 1960.

Oats believed to be affected by red leaf [virus: **40**, 101] were found growing near to barley affected by barley yellow dwarf virus.

CHAMBERS (S. C.). **Scald of Barley.**—*J. Agric. W. Aust.*, 4th ser., **1**, 12, p. 1129, 1 fig., 1960.

A note on the occurrence, symptoms, and control of *Rhynchosporium secalis* [**5**, 279], common locally on barley from late winter to early spring, but not apparently on any other hosts.

INOUE (Y.), WATANABE (Y.), & TSUDA (Y.). **On the timely spraying period for the fungicidal control of the scald of the naked Barley.** –*Bull. 1st Agron. Div., Tôkai-Kinki agric. Exp. Sta.* 6, pp. 182–200, 11 graphs, 1959. [Jap. Abs. from Engl. summ.]

The best control of barley scald [*Rhynchosporium secalis*: **35**, 601] in spraying experiments from 1954-57 was given by 2 applications of phygon, the 1st just before winter when the disease spreads and the 2nd during stem elongation just before heading, when further severe spread occurs. Increases in yield were 5-7%.

SHUL'GA (Mme M. S.). Новый способ искуственного заражения Овса покрытой и пыльной головней. [A new method for the artificial inoculation of Oats with covered and loose smut.]—Труд. всес. н.-и. Инст. сахар. Свеклы [*Trud. vses. n.-i. Inst. sakhar. Sveklȳ*], *1959*, 34, pp. 300–302, 1959. [Abs. in *Referat. Zh. Biol., 1960*, 19, p. 165, 1960.]

The method described is recommended for use in selecting and testing oats for resistance to loose smut [*Ustilago avenae*: **40**, 299] and covered smut [*U. hordei*: **38**, 401].

IVASHENKO (A. A.). Культура спорыньи на озимой Ржи. [Ergot cultivation on winter Rye.]—Аптечное Дело [*Aptechnoe Delo*], **9**, 6, pp. 59–62, 1 fig., 1960.

In 1955 the Moshkovskiĭ State Farm of the Officinal Plant Trust, with the Siberian regional exp. Sta. for Officinal Plants, began an experimental and production study of ergot (*Claviceps purpurea*) [**39**, 295]. Early and careful inoculation at the beginning of the heading period proved to be decisive factors. Infection at flowering by spraying with a spore suspension was ineffective.

HEROLD (FRIEDA), BERGOLD (G. H.), & WEIBEL (J.). **Isolation and electron microscopic demonstration of a virus infecting Corn (Zea mays L.).** –*Virology*, **12**, 3, pp. 335–347, 11 fig., 1960.

At Inst. venez. Invest. cient., Caracas, sections of virus-infected maize leaves contained particles round the nucleus thought to be of virus nature.

Munjal (R. L.) & Kapoor (J. N.). **Some unrecorded diseases of Sorghum and Maize from India.**—*Curr. Sci.*, **29**, 11, pp. 442–443, 1960.

During 1959 *Helminthosporium sorghicola* and *Ascochyta sorghina* were newly recorded on sorghum, and *Cochliobolus heterostrophus* [map 346] on maize. It is evident from an examination of herbarium material that *C. heterostrophus* has been present for some time.

Podhradszky (J.). **A Kukorica betegségei Magyarországon és a védekezés irányelvei.** [Diseases of Maize in Hungary and some remarks on their control.] – *Növénytermelés*, **9**, 4, pp. 321–334, 3 fig., 1960. [Russ., Engl. summ. 21 ref.]

This survey by Res. Inst. Plant Prot., Budapest, Hungary, records *Sorosporium holci-sorghi* f. *zeae* [*Sphacelotheca reiliana*: map 69] and *Helminthosporium turcicum* [cf. **36**, 693] as being severe in recent years, second only to *Ustilago maydis* [cf. **38**, 739]. As continued cultivation of maize results in up to 20–40% infection by *U. maydis* and *S. reiliana* crop rotation is advised. In addition, breeding for resistance, destruction of debris, use of herbicides, deep tilling, soil dressing with P, and thick sowing to prevent injuries by wind and spore dispersal by air movement in the stands are recommended.

Late harvest favoured the spread of *Nigrospora oryzae* [**36**, 693] and some other moulds, such as *Gibberella zeae* and *G. fujikuroi*, which greatly reduced seed quality. Before treatment with 0·2% thiram—lindane—talc—mineral oil or 0·2% fernasan 75 W seed should be dried thoroughly, especially if infected, damaged, or unripe seed is to be sown in cold soil.

Of other pathogens, *Puccinia sorghi*, *Pseudomonas andropogoni* [cf. **8**, 440], and *Epicoccum nigrum* are included.

Pavgi (M. S.). **Morphology, taxonomy, and cytology of the Corn rust fungi.**—*Diss. Abstr.*, **21**, 3, pp. 419–420, 1960.

Comparative studies of herbarium and field collections of *Puccinia sorghi*, *P. polysora* [**39**, 303], and *P. purpurea* at Univ. Wis. showed that sorus development and spore production, but not spore morphology, were affected by environmental conditions and host compatibility. Strs. of *P. sorghi* inciting the mesothetic (X) reaction on a homozygous susceptible maize line were similar morphologically to those causing the susceptible (S) reaction. Germination of overwintered *P. sorghi* teleutospores depended on maturity and environmental factors, nuclear division and basidiospore development being inhibited by excessive moisture. For *P. sorghi* n = 5, and the existence of a similar basic chromosome number in maize supports the hypothesis that host and parasite evolved contemporaneously.

Successful parasitism apparently depends on surface contact of germ tubes, complementary light, differential temp. and moisture, and compatible genotype interaction.

Van Hoof (H. A.). **De verspreiding van hoja blanca in Suriname en het voorkomen ervan in Brits Guyana.** [The spread of hoja blanca in Surinam and its occurrence in British Guiana.]—*Surinaam. Landb.*, **8**, 4, p. 160, 1960.

Hoja blanca virus disease, found on rice in Surinam [**39**, 169] at Nickerie in 1958, has now spread to Wageningen. The suggestion that the disease originally came from British Guiana is no longer considered valid [cf. **40**, 11].

Vámos (R.), Zsoldos (F.), & Petrasovits (I.). **Relations of intensity of photosynthesis and appearance of Piricularia oryzae Cav. on the Rice plant.**—*Nature, Lond.*, **189**, 4762, p. 407, 1961.

During co-operative studies at the Inst. Plant Physiol., Univ. Szeged, and Szarvas Res. Inst. for Irrig. and Rice Cult., Hungary, it was noted that some crops were

unaffected by the presence of *P. oryzae* while others were severely damaged by browning disease (brusone) [**40**, 302] in the absence of the fungus. Results suggest that *P. oryzae* is connected with unfavourable environmental conditions affecting rice rather than being the cause of the disease. Both pathogen and disease were absent in years of abundant sunshine. In var. Dunghan Shali, susceptible to brusone, no infection occurred before stem elongation; after this plants under a black cover all died, those under a blue one became very thin, under red they elongated, and under white the plants were severely infected by *P. oryzae*. Upon removal of the white cover the infected plants produced a crop.

It was concluded that the white cover inhibited photosynthesis in the rice plant while the undisturbed vital processes in the red light prevent *P. oryzae* from establishing itself. Fungal infection was possible only during the generative growth phase after elongation, when O carried to the roots decreased.

Ganguly (D.) & Padmanaghan (S. Y.). **Helminthosporium disease of Rice. III. Breeding resistant varieties—selection of resistant varieties from genetic stock.** —*Indian Phytopath.*, **12** (*1959*), 2, pp. 99–110, 1 col. pl., [1960].

The results are presented of further trials at the Cent. Rice Res. Inst., Cuttack [cf. **34**, 104]. Of 538 strs. obtained from India, China, Japan, Pakistan, Russia, and U.S.A., Ch. 13, Ch. 45, T. 141, T. 498-2A, Co. 20, and BAM. 10 were rated resistant to *Cochliobolus miyabeanus*.

Mironenko (P. V.). Фузариозное увядание Риса в районах Прикаспия. [*Fusarium* wilt of Rice in the Caspian area.]—Труд. всес. Инст. Защ. Раст. [*Trud. vses. Inst. Zashch. Rast.*], *1960*, 14, pp. 123–128, 1960.

This disease, noticed especially on late-sown rice, was found to be associated with *Fusarium oxysporum*, *F. heterosporum*, *F. graminearum*, and some other spp., which were isolated from seed and from plant debris in the soil. They were viable at 31–46° [C.], temps. occurring in the Caspian area, and sporulated in soil at pH 4–9·18, though opt. media for mycelial growth were slightly acid to neutral and for spore formation slightly alkaline. A 0·5% Na bisulphate and Na chloride content in natural soils diminished the resistance of rice to *F.* wilting. The ability of seed 10–40% infected to germinate was reduced 2–3 times. Excellent control was obtained from application to the soil of silicate bacteria + basic fertilizers (N 54, P 54, K 90), which resulted in an elimination of infection (up to 12% in the control) and a slight increase in seed yield. Treatment of moistened seed with 23% rhodane at 500 g./100 l./1,000 kg. is recommended.

Maruyama (A.), Haga (T.), Wada (T.), Maruyama (S.), & Satokawa (O.). **New Paddy Rice varieties.**—*Bull. 1st Agron. Div., Tôkai-Kinki agric. Exp. Sta.* 6, pp. 201–226, 8 fig., 1959. [Jap. Abs. from Engl. summ.]

Four new vars. are described with notes on the diseases to which they are resistant [**35**, 40]. Shioji and Hamayn (Shinriki 798 × Norin 23) are resistant to blast and neck rot [*Piricularia oryzae*: **39**, 374] and bacterial leaf blight [*Xanthomonas oryzae*: **35**, 547] and the former to leaf spot [*Cochliobolus miyabeanus*]. Chiyohikari (Chukyo-Asaki × Norin 22) is similarly resistant, but Yamabiko from the same cross is slightly less resistant to *X. oryzae* and *C. miyabeanus*.

Inoue (Y.) & Tsuda (Y.). **On the assessment of damages in yield of the Rice plant attacked by bacterial leaf blight.**—*Bull. 1st Agron. Div., Tôkai-Kinki agric. Exp. Sta.* 6, pp. 154–167, 8 graphs, 1959. [Jap. Abs. from Engl. summ.]

In field experiments in 1956–7 rice was sprayed with suspensions of the leaf blight pathogen [*Xanthomonas oryzae*: **39**, 103 and above] at 3 stages of maturity. The disease caused an increase in the proportion of immature grain and a decrease in

wt. The effect on yield (Y%) was calculated from the formula:

$$Y\% = \frac{1\,I+3\,II+4\,III+5\,IV+7\,V}{20}$$

where the roman numerals denote the type of symptoms, viz. I, leaves 20% surface damaged; II, 30–40%; III, 50%; IV, 60%; and V > 70%. The arabic numerals are the indexes of the degree of damage calculated from experimental results. The formula is applicable to the 'boot' to 'milky ripening' stages, after which the value of Y should be halved.

Bhapkar (D. G.), Kulkarni (N. B.), & Chavan (V. M.). **Bacterial blight of Paddy.** —*Poona agric. Coll. Mag.*, **51**, 1, pp. 36–46, 1960.

Bacterial blight of paddy rice was 1st observed in Mahrashtra (formerly Bombay) State in 1951, when it was reported in Kolaba District. In 1952 it reappeared in the same area on a small scale, and in 1953 affected most of the paddy-growing areas of Kolaba, Thana, and Ratnagiri Districts, with a rather severe epiphytotic in Thana. Since 1953 the disease has established itself in most of these rice areas and is serious every yr. in Aug.–Sept.

It is usually noticed 3 weeks after transplanting and continues to maturity. The 1st visible symptoms are yellowing of the leaf tips followed by drying. The entire crop becomes affected in 2 weeks–1 month. The leaves develop yellowish marginal streaks and finally dry and die. 'Stout' seedlings are affected 1st, but gradually all the plants are attacked and may be killed outright, or if they recover tiller poorly with consequently reduced yield. Yellowing followed by drying affects the leaf sheaths also and in severe cases the stem develops a brown rot followed by longitudinal cracking and drying. The panicle of affected plants is small and has a blighted appearance and the grains may fail to fill. Treatment of seed and seedlings with a Cu fungicide, use of seed from a clean source, and 1 spray before flowering are recommended for control.

The causal organism is considered to differ in some respects from *Xanthomonas kresek* [**34**, 672] and from *X. oryzae* [**38**, 496]; it is suggested that it may be a n.sp.

Said (M.) & Ryan (G. F.). **Fungicidal treatment of Citrus seed.**—*Calif. Citrogr.*, **46**, 4, pp. 125, 127, 1961.

At Univ. Calif., Los Angeles, treatment of citrus seed with 8-hydroxyquinoline, 8-hydroxyquinoline sulphate, fermate, phygon [**40**, 223], and arasan, prevented non-genetic albinism [**39**, 171] and virescence (mottled green and white seedlings). Arasan had an exceptionally favourable effect on the storage life of Cleopatra mandarin seed. With seed of rootstock spp. parzate and captan powders shaken with the seed and 8-hydroxyquinoline sulphate applied as a liquid gave normal seedlings, whereas in the untreated 0–12% were chlorophyll-deficient. The only effective treatments for sweet orange and grapefruit seeds were 8-hydroxyquinoline, parzate, and arasan. Germination was sometimes delayed.

Knorr (L. C.), Webster (B. N.), & Malaguti (G.). **Injuries in Citrus attributed to Brevipalpus mites, including Brevipalpus gall, a newly reported disorder in Sour-Orange seedlings.**—*F.A.O. Plant Prot. Bull.*, **8**, 12, pp. 141–149, 7 fig., 1960. [18 ref.]

A useful illustrated account of various malformations of citrus sometimes thought to be caused by fungi or viruses but in fact associated with mites [cf. **37**, 585; **40**, 106].

Sludskaya (Mme L. A.). Материалы по микоризе Цитрусовых растений. [Data on mycorrhiza of Citrus plants.]—Сборн. Работ Каф. Бот. Моск. сел.-хоз.

Акад. [*Sborn. Rabot Kaf. Bot. Mosk. sel.-khoz. Acad.*], *1958*, 1, pp. 128–147, 1958. [Abs. in *Referat. Zh. Biol.*, *1960*, 18, p. 88, 1960.]

In roots of lemon, orange [cf. **37**, 721], and *Poncirus trifoliata* from the Caucasus, Kuĭbyshev, and Moscow endotrophic mycorrhiza were found, but only in the small branches of the large roots. Oil drops were present in mycorrhizal tissue and starch grains in non-mycorrhizal. Arbuscles, vesicles, fungus sheaths and the Hartig net were present.

Nag Raj (T. R.) & George (K. V.). **A note on Bordeaux toxicity in Coffee seedlings.** —*Indian Coffee* (*Mon. Bull. Indian Coffee Bd*), **24**, 11, pp. 452–453, 1960.

Recently reports have been made of coffee seedlings in nurseries with poor root development, often with short coralloid branches and swelling at the collar. In a trial at the Coffee Res. Sta., Mysore State, germination beds were drenched with 2, 1, and 0·5% Bordeaux 3 days before sowing. Malformations and stunting of the seedlings were most severe after 2% Bordeaux and least after 0·5% [cf. **40**, 47].

Wormer (T. M.) & Firman (I. D.). **Crinkle-leaf and hot and cold symptoms of Coffee in Kenya.**—*Kenya Coffee*, **26**, 301, pp. 13, 15–17, 8 fig., 1961.

Coffee 'crinkle-leaf' and 'hot and cold' [cf. **24**, 368; **29**, 259] are often confused. The diagnostic feature of 'crinkle-leaf' is a small brown lesion on the very young leaves, usually before they have unfolded. The spots are generally at or near the margin and the necrosed tissue may eventually be sloughed off by the production of a cambium and cork layer. Veins and interveinal areas on the lower surface may become suberized and internodes near affected leaves may be shortened. Typically the final symptom is a sickle-shaped leaf, but various leaf deformations occur, including destruction of the blade. Small, black-tipped leaves may develop and fall readily. The cause of 'crinkle-leaf' is as yet unknown. The condition is sometimes reduced by shade.

Leaves affected by 'hot and cold' are usually small and leathery with an uneven surface and a yellow marginal band broadening near the tip. When symptoms are severe, this band spreads between the veins and only a small part of the leaf remains green. Later, the band may die back and the tissue turn brown, the plant appearing as if affected by 'crinkle-leaf'. Only exposed leaves show the symptoms. In the condition known as 'intermittent chlorosis', on the other hand, all the young leaves of the same age, often over a large part of a plantation, are completely yellow; abnormal meteorological conditions when these leaves are forming may be the cause. Shaded coffee is not usually affected by 'hot and cold'. The symptoms of 'hot and cold' resemble those of Ca deficiency [cf. **36**, 101], but affected plants are not invariably low in Ca.

The economic importance of 'hot and cold' in Kenya seems to be negligible, but 'crinkle-leaf' appears to have a serious effect in many areas, particularly at higher altitudes.

Armstrong (G. M.) & Armstrong (J[oanne] K.). **American, Egyptian, and Indian Cotton-wilt Fusaria: their pathogenicity and relationship to other wilt Fusaria.** —*Tech. Bull. U.S. Dep. Agric.* 1219, 18 pp., 1960. [29 ref.]

Following a review of the literature the authors present more detailed results of inoculating cotton spp. and vars. with U.S., Egyptian, and Indian strs. of *F. oxysporum* f. *vasinfectum* [**35**, 88] and with wilt *F.* spp. from other plants [cf. **38**, 732]. With 7 cotton vars. as differential hosts, 3 races of *F.o.* f. *vasinfectum*, 1 from each geographic area, were identified, but with other differentials the number of races appeared to be different. The commercial vars. of *Gossypium hirsutum* used in these tests were not susceptible to either the Egyptian or the Indian str. In U.S.A. there appeared to be 2 races on cotton; race 2 was pathogenic to Yelredo soybean and flue-cured tobacco whereas race 1 was not. It is concluded that there

are 4 races of *F.o.* f. *vasinfectum*, 1 and 2 from the U.S.A., 3 from Egypt, and 4 from India.

Avtonomov (A. A.). Метод ранней диагностики устойчивости сортов тонковолокнистого Хлопчатника к фузариозному вилту. [A method for the early diagnosis of resistance to *Fusarium* wilt in long-staple Cotton varieties.]—Хлопководство [*Khlopkovodstvo*], **8**, 11, pp. 35–36, 3 fig., 1958.

At the central Select. Sta., All-Union sci. Res. Inst. for Cotton, a method has been elaborated for assessing resistance to *F.* wilt [*F. oxysporum* f. *vasinfectum*: **39**, 25] before sowing in the field. Soil impregnated with mycelium is made up of 75–85% (wt.) normal tilth from a 2nd yr. site after ploughing lucerne, 10–15% sand, and 5–10% rotting horse manure, mixed with dry, macerated cultures on rice. It is best prepared in early summer and kept in a special bed sown with a susceptible var. so that infection accumulates. A forcing bed is prepared, but the surface of the manure is covered with 5–6 cm. of soil from an infected site. Paper containers with the inoculated soil are then placed in the bed and seed of the test vars. sown (end Feb.–beginning Mar. near Tashkent). Both in the forcing bed and in the field symptoms begin to show with the appearance of the cotyledons, and develop strongly with the formation of the 3–5 true leaves. Soon 70–90% of the plants of non-resistant vars. in the forcing bed die. The remainder can be used for further selection. Results from the forcing bed give a more exact indication of the degree of infection than sowing in infested soil in the field.

Avetisyan (A. D.). О дубильных веществах, углеводах и карбогидразах Хлопчатника в связи с устойчивостью к увяданию. [On tannins, carbohydrates, and carbohydrases of Cotton in relation to wilt resistance.]—Изв. Акад. Наук Армян. ССР [*Izv. Akad. Nauk Armyan. S.S.R.*], biol. Sci., **13**, 7, pp. 35–45, 1960. [Arm. summ.]

Experiments by the Inst. Agric., Armenian S.S.R., showed that potential resistance of cotton vars. to wilt [*Verticillium* sp.: **40**, 308] can be determined from the total reducing substance and starch content and amylase activity, though the degree of infection cannot be established. The quantity of reducing substances in the stem wood of infected plants decreases at the cost of starch. With increase in the degree of infection polyphenols and unsaturated and fatty compounds increase, plants of resistant vars. being richer in these compounds than susceptible. In infected plants of comparatively resistant vars. the conc. of tannic substances increases sharply, inhibiting the hydrolytic enzymes and restricting or completely cutting off the flow of nutrients to the parasite. Tannin has the highest inhibitory action on amylase activity, followed by hydroquinone, and pyrocatechin.

Askarova (Mme S. A.). К вопросу о действии микробов-антагонистов и их веществ на возбудителя гоммоза Хлопчатника. [On the action of antagonistic microbes and their substances on the causal agent of Cotton gummosis.] *In* Микробиол. на службе сел. Хоз. [Microbiology in the service of Agriculture], pp. 301–307, Moscow, Sel'khozgiz, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 19, p. 167, 1960.]

At the Inst. Cotton Growing and the Inst. Microbiol., Acad. Sci. U.S.S.R., presowing treatment of cotton seed and spraying the shoots in the field with antibiotic substances from *Actinomyces* [*Streptomyces*] *candidus* gave good results against *Pseudomonas* [*Xanthomonas*] *malvacearum* [**38**, 599; **40**, 225].

Rataj (K.) & Zapletalová (Anežka). **Vorläufige Mitteilung über die Gelbkrankheit des Flachses (Linum usitatissimum).** [Preliminary report on the yellow disease of Flax.]—*Preslia*, **31**, 2, pp. 185–186, 2 fig., 1959.

The symptoms of this disease [cf. **38**, 209], which in 1955 and 1956 appeared after

flowering in late-sown crops in Czechoslovakia, included yellowing of the tops, abnormal stem branching, lengthening of the sepals up to 18 mm., and sterility. Most attacks were concentrated in circular areas inside healthy stands. In 1957 the apices became light yellow before flowers developed, some buds dried before opening, and petals, which were light blue and crinkled if slightly affected, became stunted with more severe attacks and showed strong virescence. The causal agent is believed to be a virus and attempts at its identification are being made.

Rataj (K.). **Fyziologické biotypy houby Colletotrichum lini (West.) Touch.** [Physiological biotypes of the fungus *C. linicola*.]—*Len a Konopí, 1960*, 1, pp. 29–43, 1960. [Russ., Germ., Engl. summ. 14 ref.]

In the tests by the Res. Sta. for Fibrous Plants, Šumperk-Temenice, Czechoslovakia, for resistance to 32 isolates (16 races) of *C. linicola* [cf. **36**, 29] from Czechoslovakia (6 races), Netherlands, Germany, Canada, and U.S.A., the flax vars. Ottawa 770 B (C.I. 335), C.I. 1016, Leona, C.I. 1247, C.I. 1235, and lines from local stocks R 1/1 and R 2/1 [**38**, 209], and to some extent Bison, Linota, Capa, Cirrus, and C.I. 188 proved suitable for breeding. No var. was immune from all isolates. Six new races, some of them pathogenic to C.I. 1235, are described, of which 2 are Czechoslovak.

Belokhonov (I. V.). Плодоводство. [Fruit Growing.]—496 pp., illus., Moscow, Sel'khozgiz, 1958. Roubles 12.90. (3rd, revised, ed.)

Part 7 of this monograph deals with 'The control of pests and diseases of fruit and berry crops' (pp. 433–481). In chapt. 25 (pp. 433–446) control methods are considered; chapt. 26 (pp. 446–449) contains sections on fungus and bacterial diseases of plants, and the effect of environment on the development of pests and causal agents of disease; chapt. 29 (pp. 477–481) is concerned with diseases of fruit and berry crops. There is an appendix (pp. 482–490) with tables of control measures.

Ablakatova (Mme A. A.). К микофлоре плодовых растений Приморского края. [On the mycoflora of fruit plants of the Primorskiĭ kraĭ.]—Труд. горно-таежн. Ст. дальневост. Фил., Сибирск. Акад. Наук СССР [*Trud. gorno-taezhn. St. dal'nevost. Fil., Sibirsk. Akad. Nauk. S.S.S.R.*]. *1959*, 6, pp. 157–173, 1959. [Abs. in *Referat. Zh. Biol., 1960*, 19, p. 167, 1960.]

In this 17-yr. survey of cultivated and wild fruit plants 64 spp. of fungi and 3 of bacteria were recorded, 42 fungus spp. for the 1st time in the area. *Cytosporina ludibunda* on apple was a new record for the U.S.S.R. Economically serious were *Polystigma ussuriensis* on Ussuri plum, *Monilia* [*Sclerotinia*] *laxa* on stone fruit, *Clasterosporium carpophilum* [map 188] on apricot, plum, and cherry, and *Exoascus* [*Taphrina*] *pruni* on plum.

Stapp (C.). **Eine gefürchtete bakterielle Krankheit der Obstbäume — der 'Feuerbrand'.** [A dreaded bacterial disease of fruit trees—fire-blight.]—*Pflanzenarzt*, **13**, 7, pp. 71–74, 4 fig., 1960.

A description of the symptoms caused by *Erwinia amylovora* on pome fruit trees with suggested control measures in the event of the disease spreading to continental Europe [cf. **40**, 55].

Blodgett (E. C.) & Aichele (M. D.). **Symptoms and transmission of a 'star cracking' type disease of Apple in Washington.**—*Plant Dis. Reptr*, **45**, 1, p. 45, 1 fig., 1961.

At Irrigation Exp. Sta., Prosser, Wash., symptoms on Golden Delicious apple fruit, resembling star-cracking [cf. **38**, 526], were transmitted to fruit of healthy Golden Delicious scions grafted on to affected trees. There were no leaf symptoms.

Baxter (P.). **Bitter pit of Apples. Effect of calcium sprays.**—*J. Agric. Vict.*, **58**, 12, pp. 801–807, 809, 811, 4 fig., 4 graphs, 1960.

Growers on a small scale are recommended to supplement the usual orchard practices against bitter pit [cf. **40**, 232 and below] by spraying 2 or 3 times with 1% hydrated Ca nitrate [cf. **39**, 476]+wetting agent in Nov.–Dec. and once with 0·75% 2 or 3 weeks before harvest, or alternatively with hydrated Ca chloride at 0·7 and 0·5%, respectively.

Melville (F.) & Hardisty (S. E.). **Bitter pit. A progress report on the use of calcium nitrate sprays for its control.**—*J. Agric. W. Aust.*, 4th ser., **1**, 11, pp. 1017–1019, 1960.

In W. Australia bitter pit [cf. above] occurs most frequently on Cleopatra and Granny Smith, and on Golden Delicious in light crops and on young trees. In a spraying trial at Bridgetown total bitter pit was reduced from 24% in untreated to 5% in those sprayed with $Ca(NO_3)_2$ (16 lb. 100 gal.); applications should be made 3 times in Dec.–Jan. at 10 lb./100 gal. for general use.

Black spot of Apples and Pears.—*J. Agric. S. Aust.*, **64**, 2, pp. 83–84, 1960.

Revised recommendations for spraying against apple and pear black spot [*Venturia inaequalis* and *V. pirina*] in S. Australia [cf. **34**, 96] are, for spring and summer eradication, PMC (phenyl mercury chloride) 0·005% = 2 oz./100 gal. (40% wettable powder) or PMF 6–8 oz. 100 gal.; where conditions favour late infection, thiram or captan should be applied in Feb.; 0·01% PMC applied after harvest before leaf fall is a valuable additional spray [cf. **36**, 192, *et passim*].

[In *J. Agric. S. Aust.*, **64**, 3, there appears on p. 112 a corrected version of the table given on p. 84 of fungicides and their effectiveness.]

Onyshchenko (I. Ĭ.). Про гомоз та зміни, що він викликає в тканинах Сливових. [On gummosis and the resulting changes in the tissue of Prunoideae.]—*J. Bot. Acad. Sci. Ukr.*, **17**, 5, pp. 93–96, 5 fig., 1960. [Russ., Engl. summ.]

The initial cause of cherry gummosis in most of the cases observed by the Umans'kiĭ pedagogical Inst. was *Monilia cinerea* [*Sclerotinia laxa*: **38**, 611], while mazzard cherry, plum, and especially peach were usually affected following damage by frost or animal pests, and various other injuries. Gummosis may also be due to other causes, especially physiological or soil conditions. In Lotova cherry and the mazzard vars. Drogana zhovta and Denisena zhovta pathological changes usually begin in the cambium, formation of lysegenic gum receptacles and cell destruction spreading towards the secondary cortex and secondary xylem. With mechanical injuries cell destruction starts from injured xylem or cortex cells. In peach only the bark is usually destroyed.

Keil (H. L.) & Wilson (R. A.). **Powdery mildew on Peach.**—*Plant Dis. Reptr*, **45**, 1, pp. 10–11, 1961.

At the Crops Res. Div., Beltsville, Md, the less common powdery mildew, *Podosphaera oxyacanthae*, developed naturally on potted peach plants in the greenhouse, as did *P. leucotricha* on apple plants; cross inoculations caused no infection. The F.V. 331–52 and Okinawa seedlings proved the most resistant to *P. oxyacanthae* and H-98 and N.J.-94727 the least of a number of vars. tested.

Tulloch (H. W.). **Grafting mastic is best wound protectant for Apricot gummosis control.**—*J. Agric. S. Aust.*, **64**, 5, pp. 204–205, 1 diag., 1960.

In tests at Nuriootpa with a proprietary bitumen emulsion incorporating organic Hg, a medical plastic dressing paint, and a proprietary grafting mastic to prevent infection of pruning wounds on apricot trees by *Eutypa armeniacae* [**39**,

330; **40**, 177] the wounds were treated and then sprayed with an aqueous spore suspension; the mastic reduced the number of infections 2 yr. after inoculation by 83%. The other protectants were of only minor value.

HEYNS (A. J.). **Bacterial canker of Apricot trees.**—*S. Afr. J. agric. Sci.*, **3**, 3, pp. 449–457, 1 pl. (7 fig.), 1960. [Afrik., Fr. summ. 17 ref.]

Since 1951 apricot trees in western Cape Province have been affected by an increasingly serious die-back disease of newly sprouted twigs and branches, the symptoms of which are fully described; it is accompanied by large necrotic bark cankers and copious gumming. Some leaf spotting and occasional fruit spotting are also found. Isolations from the cankers in the spring yielded cultures (of which details are given) of *Pseudomonas syringae* [cf. **37**, 489], not previously recorded on this host in S. Africa, and it was shown to be pathogenic.

Not all apricot die-back in western Cape Province is attributable to *P. syringae*. A similar disease entailing failure to produce leaves in spring, though without the characteristic bark cankers, is common, but no pathogenic bacteria have been isolated from trees with these symptoms.

BOS (L.). **A witches' broom virus disease of Vaccinium myrtillus in the Netherlands.**—*Tijdschr. PlZiekt.*, **66**, 4, pp. 259–263, 2 pl., 1960. [Dutch summ.]

The virus nature of this disease, prevalent near Wageningen, was demonstrated by grafting. Symptoms include excessive branching, reduced leaf size, dwarfing of the plants and absence of subterranean suckers in severe cases, late leaf fall, early sprouting, and chlorosis and occasional reddening of the leaves. Diseased plants do not flower. No transmission was obtained in preliminary experiments with dodder and leafhoppers. The relationship of this disease to the American cranberry false blossom [**25**, 126] and *Vaccinium* stunt [**39**, 602] is uncertain, but the symptoms appear identical with those of 'little leaf' of the same host and *V. vitis-idaea* in Czechoslovakia.

GOLUBINTSEVA (Mme A.). Стеблевой рак Малины. [Stem canker of Raspberry.]—Сел. Хоз. Сибири [*Sel. Khoz. Sibiri*], **5**, 10, p. 63, 1 fig., 1960.

Tumours were reported in July 1959 from the Novosibirsk Plant Protect. Sta. on fruit-bearing raspberry canes in collective gardens in NW. Novosibirsk, which looked like those of *Agrobacterium rubi* [**39**, 426]. Infection increased during the spring 1960 following heavy rains and temp. fluctuations.

FRAZIER (N. W.) & SYLVESTER (E. S.). **Half-lives of transmissibility of two aphid-borne viruses.**—*Virology*, **12**, 2, pp. 233–244, 6 graphs, 1960.

Tests at Univ. Calif., Berkeley, with strawberry veinbanding virus and 7 variants of strawberry mottle virus in *Pentatrichopus thomasi*, *P. jacobi*, and 2 clones of *P. fragaefolii* gave evidence that the rate at which fasting vectors lose their inoculativity can be expressed exponentially and that the virus half-life [cf. Sylvester, **35**, 861; **38**, 458] as a measure of the retention of vector inoculativity is independent of vector sp. and vector efficiency. Rate of vector inoculativity decrease may be a measure of virus inactivation and an intrinsic property of the virus.

TOLLENAAR (D.). **Effects of copper and oil in the control of Sigatoka Banana leaf spot.**—*Netherlands J. agric. Sci.*, **8**, 4, pp. 253–260, 2 fig., 1960. [15 ref.]

The use of oil against banana leaf spot [*Mycosphaerella musicola*: **34**, 381; **40**, 58, 317] is reviewed. It has ceased in most countries because it reduces growth, production, fruit weight, and new sucker production. In Ecuador, however, with its favourable conditions for banana growth, the plants have more active green leaves than in most countries, and that may explain why this depressive effect on production has not been reported there.

Oil is a great help when control of the disease is lost, but Cu is the right fungicide to use once control has been regained and to maintain this control in the safest way. The abandoning of oil spraying in Ecuador during the dry season leads to an intensification of the disease. Cu spraying can be interrupted without danger of losing control.

SARKAR (A.). **Leaf spot disease of Mangifera indica L. caused by Pestalotia mangiferae Butl.**—*Lloydia*, **23**, 1, pp. 1–7, 1960.

Leaf spot of mango [**35**, 373] is fairly widespread in W. Bengal. Cultural studies are described. *P. mangiferae* grew well on several media, the opt. temp. being 20–25° C. and opt. pH 5·5–6. Healthy mature leaves were attacked in inoculation tests. Langra was the most resistant of 3 vars. tested, Bombai the most susceptible, and Himsagar intermediate.

CASTELLANI (E.) & MATTA (A.). **Differenziazione nutrizionale di alcuni isolamenti di Cycloconium oleaginum Cast.** [Nutritional differentiation of some isolates of *C. oleaginum*.]—*Phytopath. medit.*, **1**, pp. 17–24, 1960. [Engl., Fr. summ. 14 ref.]

At Univ. degli Studi, Turin, 16 isolates of *C. oleaginum* [**39**, 607; **40**, 236] from lesions on olive leaves from different parts of Italy were placed in 10 cultural races on the basis of their utilization of 7 sugars and 7 water-soluble vitamins. Five races made good growth both with and without thiamine, whereas the others failed to synthesize it sufficiently for their needs.

SALERNO (M.). **Appunti sull' epidemiologia della 'rogna' dell' Olivo [Ps. savastanoi (Smith) Stevens] in Sicilia e prove di suscettibilità di alcune cultivar alla malattia.** [Notes on the epidemiology of Olive 'knot' disease (*Pseudomonas savastanoi*) in Sicily and tests of the susceptibility of certain cultivars to the disease.]—*Riv. Pat. veg., Pavia*, Ser. 3, **1** (*1961*), 1, pp. 17–37, 1 pl., 3 graphs, 1960. [Engl. summ. 12 ref.]

At Univ. Catania, Sicily, over a period of 12 months tubercles of olive knot disease (*P. savastanoi*) [cf. **39**, 435, *et passim*] developing on branches of the susceptible Moresca (Morhetana) var. previously wounded with a needle were counted, and the susceptibility of different vars. was investigated by means of inoculations. Infection occurred at virtually any time of the yr. providing rainy weather prevailed [cf. **38**, 270], the temp. range for infection being 4–38° C. The incubation period varied from 1 month (in late spring and summer) to 3 months (in winter). The disease was favoured by an av. temp. of 25–30°. Tests of var. susceptibility failed to give significant results. Resistance to infection appears to be related to resistance to frost and other traumatic factors which may facilitate infection.

HASTIE (A. C.). **Variation in Verticillium albo-atrum from Hop.**—Abs. in *Trans. Brit. mycol. Soc.*, **43**, 4, p. 696, 1960.

Experiments confirmed the occurrence of heterokaryosis in *V. alboatrum* by the use of nutritionally deficient mutants, spontaneous or obtained after UV irradiation. When spores from a hyaline resistant str. were mixed with those from a sensitive str. and incubated on Czapek-Dox medium conidia of both parental types were obtained from hyphal tips of slow-growing sectors of the colony. A number of mutant phenotypes were obtained, all recovered indirectly from a single conidium which was probably uninucleate. It is concluded that a system similar to parasexuality gives rise to novel progeny in *V. alboatrum*.

ZATTLER (F.) & CHROMETZKA (P.). **Zur Biologie von Verticillium alboatrum R. u. B., dem Erreger der Welkekrankheit des Hopfens.** [On the biology of *V. albo-*

atrum, the causal agent of Hop wilt.]—*Prakt. Bl. PflBau.*, **55**, 1, pp. 17–23, 2 fig., 1960.

Isolates of *V. alboatrum* from stem pieces from 24 hop gardens in the Hallertau region of Germany [cf. **40**, 60] were all equally virulent and no morphological or physiological differences were established. Potato agar was the best of the media tested. Temp. is the decisive factor for virulence in the soil. Max. for growth in culture was 27° C. and the disease does not attain epidemic proportions when the soil temp. at a depth of 10 cm. is over 28°. The effect of soil type on disease severity is related to the water capacity and temp. level. Humus or clay soils with a low rate of heat exchange are better able to maintain an opt. for *V. alboatrum* (20°) than soils poor in humus or sandy.

Staněk (M.), Ujevič (I.), Petrlík (Z.), & Štys (Z.). **První pokusy s použitím antifungálních antibiotik fungicidinu a aktidionu proti peronospoře Chmelové.** [First experiments in the use of the antifungal antibiotics, fungicidin and actidione, against peronosporosis of Hops.]—*Ann. Acad. tchécosl. Agric.*, **32**, 7, pp. 941–950, 1959. [Russ. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 18, p. 179, 1960.]

Comparative tests showed that a considerable reduction of infection of hops by *Pseudoperonospora humuli* [cf. **39**, 482 and below] was obtained by the use of fungicidin (0·025–0·2%) and actidione (0·00125–0·005%). They were less effective than Cu preparations, especially cupricol, and actidione caused necrotic lesions on leaves and cones, but both penetrated leaf tissue better. Spraying of leaves and cones with the antibiotics protects them from *Fusarium*.

Petrlík (Z.) & Štys (Z.). **Nový způsob kultivace peronospory Chmelové.** [A new way of cultivating *Pseudoperonospora humuli*.]—*Čes. Mykol.*, **15**, 1, pp. 28–30, 3 fig., 1961.

At the Hop Res. Inst., Žatec. Czechoslovakia, *P. humuli* [cf. above] was cultured successfully on healthy hop cuttings. The zoospores germinated well and were used for repeated inoculations.

Brejcha (V.), Neubauer (Š.), & Starý (F.). **Zkušenosti s ochranou některých léčivých rostlin.** [Experiences with the protection of some officinal plants.]—*Preslia*, **31**, 3, pp. 331–332, 1959. [Engl. summ.]

At the Res. Inst. officinal Plants, Prague, none of the fungicides tested was effective against *Puccinia menthae* on peppermint [cf. **35**, 487] or *P. malvacearum* on *Hibiscus* and *Malva*. A difference in the severity of rust infection was noticed between a peppermint var. bred by the Institute and a local var. The viral nature of a hitherto undescribed mosaic on peppermint was demonstrated by grafting; affected plants were free from *P. menthae*. The rust on Malvaceae was prevented by early harvest.

Attempts to control viroses in *Digitalis purpurea* and *D. lanata* by measures against suspected vectors had only partial success. Three non-identified virus diseases (mosaic, 'wiring', and stolbur [? tomato stolbur virus]) on *Solanum aviculare* were controlled by these means and by negative selection [? roguing] and weed eradication. *Phytophthora infestans* attacked almost all *S. aviculare* stands; spraying with 1% cuprikol, 1% cuprikol+sulikol, 0·2% novozir, or 0·2% fernide, or watering with 0·02% phytostrept 3 times at weekly intervals checked spread of infection.

Petričić (J.) & Kljajić (R.). **Über den Einfluß des Parasitenpilzes Septoria digitalis Pass. auf die Menge der Wirkstoffe in folium Digitalis lanatae.** [On the influence of the parasitic fungus *S. digitalis* on the quantity of the active

substances in the foliage of *D. lanata*.]—*Pharm. Zentralh.*, **98**, 12, pp. 647–651, 3 fig., 1959.

Analytical data are presented in this joint report from the Pharmaceutical Faculty, Zagreb, and the Phytopath. Inst., Beograd, Yugoslavia, showing the reduction in the quantities of lanatoside A, B, and C, strospeside, 'strong water-soluble glycosides', secondary glycosides, and possibly glucones caused by *S. digitalis* on leaves of *D. lanata* [**38**, 325], samples of which were obtained from 5 regions. Determined by paper chromatography, the total of these components in a sample of severely infected material was 0·121% compared with 0·473 in healthy leaves.

Maas Geesteranus (H. P.). **Een geval van noodrijpheid bij Blauwmaanzaad. Pyrenophora calvescens op Blauwmaanzaad.** [A premature ripeness of seed Poppies. *Pleospora papaveracea* on seed Poppies.] —*Tijdschr. PlZiekt.*, **66**, 2, pp. 107–110, 1 pl.; 4, pp. 237–248, 3 fig., 1 graph, 1960. [Engl. summ.]

Premature dying of opium poppies occurred in the Netherlands in 1959 at the end of the growth period. Spraying with systox before flowering reduced the disease and increased yield: the damage may be caused simply by aphids or by beet yellows virus. *P. papaveracea* was present to the same degree on both treated and untreated plants. At the Inst. voor Plantenziektenkundig Onderzoek, Wageningen, the fungus attacked only dying tissues, seedling blight appearing when secondary bacteria were present. Most seed contamination occurs after harvest and in wet weather, infection seldom penetrating the outer layer of the seed [cf. **39**, 333]. Seedling blight can be partly suppressed by thiram and captan at 3–5 g./kg. seed, but the effect may be lost by harvest if there is heavy infection of the mature crop.

Keller (E. R.). **Bericht über die Hauptversuche mit mittelfrühen bis frühen Speisekartoffelsorten 1957–1959.** [Report on the principal tests of medium-early to early Potato table varieties 1957–1959.]—*Mitt. schweiz. Landw.*, **8**, 7, pp. 97–109, 1 graph, 1960.

Avenir, 1 of 4 potato vars. tested by the Eidg. Landw. Versuchsanst., Zürich, qualified for inclusion in the Swiss official list [**39**, 486], proving more resistant to haulm and tuber blight (*Phytophthora infestans*) than Bintje. Though susceptible to potato viruses X, A, and Y, it does possess a certain tolerance. Grata, Hansa, and Gallo were resistant to haulm and tuber blight and to common scab (*Actinomyces*) [*Streptomyces scabies*], but Gallo was highly susceptible to internal rust spot. All 4 were resistant to wart [*Synchytrium endobioticum*].

Keller (E. R.). **Die Veränderungen im schweizerischen Richtsortiment für den Kartoffelbau 1960/61.** [Changes in the Swiss official list of Potatoes for 1960/61.]—*Mitt. schweiz. Landw.*, **8**, 12, pp. 183–186, 2 fig., 1960.

This latest list from the Eidg. Landw. Versuchsanst., Zürich [see above], includes Cosima with av. resistance to haulm blight (*Phytophthora infestans*) for a late var. and fair resistance to tuber rot, good tolerance of leaf roll virus, and only slight susceptibility to potato virus Y. Datura was fairly resistant to *P. infestans*, susceptible to leaf roll but fairly tolerant, and remarkably resistant to virus Y. Both are subject to internal rust spot.

Kozłowska (Aniela). **Effects of environment on tuber production, potassium absorption, and susceptibility of Potatoes to virus disease in Poland.**—*Amer. Potato J.*, **37**, 11, pp. 366–372, 1960.

The transfer of Epoka and Ackersegen from opt. conditions in Pomerania [**37**, 368] to the Carpathians (300–1,200 m. above sea-level) resulted in decreased yield/plant of 44 and 59 g., respectively, for each 100 m. increase in alt., associated with an

increase in K content of the tubers. With the reverse transfer yields increased and K content decreased. The change is probably correlated with temp. There was little spread of potato leaf roll virus and streak [potato virus Y]. Transfer from below 400 m. to the lowlands was not accompanied by change of yield or K content, but susceptibility to the 2 viruses increased.

[Similar information is also published in *Acta biol. cracov.*, **3**, pp. 35–45, 3 graphs, 2 maps, 1960. (Engl.)]

Zaleski (K.) & Horówna (Władysława). **Doświadczenia nad metodą wskaźnikową bulw Ziemniaczanych (tuber index method) z lat 1953–1955. Cz. III. Rozstawa roślin w szklarni.** [Trials of the index method for testing Potato tubers (tuber index method) in the years 1953–1955. Part III. Spacing of the plants in glasshouse.]—*Roczn. Nauk rol.*, Ser. A, **79**, 4, pp. 929–944, 1959. [Russ., Engl. summ.]

At Gorzów Wlkp., Poland, tuber pieces were planted in compost: sand mixtures ($\frac{3}{4}$:$\frac{1}{4}$ or $\frac{1}{2}$:$\frac{1}{2}$) at distances of 12, 15, and 20 cm. in rows 16 cm. apart, and the same assessment techniques were applied as in previous tests (*ibid.*, Ser. A, **66**, 2, 1953; **74**, 3, 1957). Reliability of the tests in indicating healthy plants was 65–100 (av. 75%) and in indicating diseased or suspected plants 60–90 (75%) in Dar, Pioneer, Merkur, Narvik, and Koszalińskie, and 23–25% in Parnassia. Differences in spacing had no effect on the results.

Horváth (J.). **Burgonyavírusok meghatározásának újabb eredményei.** [Results of the diagnosis of Potato viruses by serological and staining methods.]—*Növénytermelés*, **9**, 3, pp. 263–268, 2 fig., 6 graphs, 1960. [Russ., Engl. summ.]

Of potato viruses in Hungary, which in 1956 were responsible for a loss of ca. 70,000 [railway] wagon-loads, leaf roll is reported by the Res. Inst. Plant Prot., Keszthely, to be the most serious (3–68% incidence), though local occurrence of potato viruses X, Y, and S was higher than originally estimated (8–42, 9–36, and 12–79%, respectively). A considerable percentage (5–50%) of the crop was infected by all 4 viruses. Among the vars. studied, including Samogyi Sárga recently grown at Marietta-puszta, Leninó was the most resistant and Kisvárdai Rózsa the most susceptible.

Cherepanova (Mme R.). Оздоровление клубней серологическим методом. [Obtaining healthy tubers by the serological method.]—Картофель Овощи [*Kartofel' Ovoshchi*], **5**, 8, pp. 28–29, 1960.

Elite potato vars. of the sci. Res. Inst. for Potato Growing and other experimental foundation 'seed' received at the Inst. in 1957 were assessed serologically for infection by potato virus X [**39**, 729] at flowering. Non-reacting clones were selected and tubers planted in 1958. In the following yr. some of the plants were again infected. It is possible to select a large number of Lorkh plants free from virus X to give healthy seed material. In 1958 the serological method revealed 37·5 and 49·5% infected haulms from Lorkh tubers obtained from the Krasnaya Armiya collective farm, Moscow region, in sandy loam and peat bog soils, respectively; they were removed. In 1959 the seed material selected was again sown on the 2 soil types, with 9·1 and 16·2% reduction of infection, respectively.

MacKinnon (J. P.), Rankin (D. F.), & Young (L. C.). **Testing Potato seedlings for resistance to the leaf roll virus.**—*Amer. Potato J.*, **37**, 11, pp. 373–376, 1960.

At the Canada Dept Agric. Res. Sta., Fredericton, N.B., field and greenhouse tests in 1955–59 showed that of 132 seedlings tested F 4896 is the most resistant to leaf roll virus.

Reichmann (M. E.). **Degradation of Potato virus X.**—*J. biol. Chem.*, **235**, 10, pp. 2959–2963, 4 fig., 2 graphs, 1960. [22 ref.]

In further studies at the Canada Dept Agric. Res. Lab., Vancouver, B.C. [cf. **38**, 615], potato virus X was degraded by 5 different methods. The results suggested that degradation with guanidine hydrochloride took place by a release of protein subunits from the particle, either at random or from the ends.

Bagnall (R. H.) & MacKinnon (J. P.). **Resistance to Potato virus A in the Katahdin variety.** *-Europ. Potato J.*, **3**, 4, pp. 331–336, 1960. [Fr., Germ. summ.]

At the Canada Dept Agric. Res. Sta., Fredericton, N.B., during 2 yr. of field exposure to adjoining infected vars. Green Mountain became 49% infected by potato virus A [cf. **39**, 186] but Katahdin did not, nor was it infected in the greenhouse by aphids. It also proved resistant to sap inoculation, though not immune. Graft transmissions with virus A were successful, but Katahdin was practically symptomless with virus A alone and developed a mosaic when virus X was also present. Several attempts to demonstrate an inhibitor in the surface tissues were unsuccessful. Aphids became infective after feeding on graft-infected Katahdin.

Bérces (S.) & Keller (E. R.). **Pfropfenbildung und Eisenfleckigkeit bei der Kartoffel.** [Cork formation and internal rust spot in Potato.]—*Mitt. schweiz. Landw.*, **8**, 12, pp. 186–190, 4 fig., 1960.

A report of confirmatory tests at Eidg. Landw. Versuchsanst., Zürich, that internal rust spot [**39**, 264] is caused by unbalanced nutrient supply and corky ringspot [spraing] by soil-borne tobacco rattle virus [potato stem mottle virus str.: cf. **39**, 610].

Holmes (E.). **The contribution of crop protection to increased world food supplies.**—*Outlook on Agric.*, **3**, 1, pp. 23–38, 5 fig. (1 col.), 1960. [39 ref.]

In this review of recent advances in crop protection, with reference to the development and use of pesticides and the setting up and operation of international and government bodies to assist under-developed countries, it is noted (pp. 35–36) that the av. annual avoidable loss from *Phytophthora infestans* on potato in England and Wales [**38**, 96] during 1947–56 was 7·8% of the crop, or 350,000 tons. In recent years only 30% of the maincrops have been sprayed, but in the very wet 1958 341,000 acres, or just over half the total potato area was treated.

Potato and Tomato blight.—*Adv. Leafl. Minist., Agric. Fish., Lond.*, 271, 9 pp., 2 fig., 1959. 3*d*.

This revised leaflet is primarily concerned with the occurrence of *Phytophthora infestans* on potato; sources of infection, forecasting outbreaks, symptoms, and methods of control are briefly outlined. A note on tomato blight is appended.

Conroy (R. J.). **Races of Phytophthora infestans (Mont.) de Bary on Potato.**—*J. Aust. Inst. agric. Sci.*, **26**, 4, pp. 357–358, 1960.

Tests of an isolate from Gosford, N.S.W., in 1957–8 showed it to be race 0 but one from Warriewood, N.S.W., in 1959 was race 4 [cf. **39**, 340]. The distribution of race 4 in N.S.W. as a whole is not known, but the breeding of potato vars. carrying gene R_4 [cf. **37**, 370] is not warranted.

Kozhevnikova (Mme N. N.). Паразитическая активность штаммов фитофторы и ее значение в селекции Картофеля. [Parasitic activity of *Phytophthora* strains and its significance in selection of Potato.]—Труд. всес. Инст. Защ. Раст. [*Trud. vses. Inst. Zashch. Rast.*] 14, pp. 93–108, 1960.

Fourteen *P. infestans* isolates [cf. **39**, 188] from tubers of potato vars. [listed] from

6 areas of the U.S.S.R. were assessed for virulence by the reaction to experimental inoculation of the leaves and tubers of the resistant vars. 8670, Detskosel'skiĭ, Kameraz No. 1, Vale, and Agronomicheskiĭ, and of the leaves of the resistant Petrovskiĭ and Zazerskiĭ. Virulent and avirulent strs., which occur together in many areas, were pathogenic to susceptible vars. and virulent strs. also to resistant vars. Great differences in virulence suggested the necessity of testing the original and hybrid material against a complex of the most virulent strs.

Golovin (P. N.), Cherepanova (Mme N. P.), & Pshedetskaya (Mme L. I.). Сравнительное изучение штаммов **Phytophthora infestans de Bary.** [A comparative study of *P. infestans* strains.]—*Bot. Zh. S.S.S.R.*, **45**, 11, pp. 1600–1618, 1960. [Engl. summ.]

Examination by the State Univ. Leningrad of 22 *P. infestans* isolates [cf. above] from various parts of the U.S.S.R. for the dimensions of the zoosporangia, host specificity (potato vars., other *Solanum* spp., tomato, tobacco, and *Datura stramonium*), symptoms (dot-like, local, and diffuse spots), and opt. temp. [all the results tabulated] showed that they belong to 13 races, distinguished from each other by well-defined morphological and biological features. Opt. temp. was generally 17–25° [C.] and sometimes differed distinctly between strs. of one race (e.g. 18 and 25° for strs. 2 and 4 of race 3). Races with zoosporangia of similar dimensions and length:breadth ratio were grouped into 5 'forms': *subglobosa*, sporangia 25×17 (l:b 1·52); *oblongula*, 27×17 (1·55); *promissa*, 29×17 (1·74); *longa*, 31×16·5–20 (1·77); and *macrogloba*, 33×19 (1·52). The races comprising each 'form' were 1; 2; 3–6; 7–11; and 12, 13, respectively. Only isolates 15–20 attacked *D. stramonium*. Characteristic relations between morphological and biological properties are considered useful for the identification of races and the elaboration of intraspecific taxonomy.

Hooker (W. J.) & Page (O. T.). **Relation of Potato tuber growth and skin maturity to infection by common scab, Streptomyces scabies.**—*Amer. Potato J.*, **37**, 12, pp. 414–423, 3 fig., 1960. [19 ref.]

At Iowa agric. Exp. Sta., Ames, macroscopically visible growth of *S. scabies* [**29**, 529; cf. **36**, 492] was prevented on intact tuber surfaces which had been fumigated with propylene oxide, autoclaved, or merely washed, but cut surfaces of either resistant or susceptible vars. which had been sterilized by propylene oxide or autoclaving permitted abundant, visible growth. Infection of tuber surfaces developed in areas where the skin was expanding rapidly. Scab lesions appeared as a circle of minute dots round the apical end of the tuber 7 days after inoculation and later coalesced to form a ring of necrotic tissue; stems and roots showed necrosis at 10–14 days.

Foucart (G.) & Delcambe (L.). **Recherche d'agents chimiothérapeutiques contre le flétrissement bactérien de la Pomme de terre.** [A search for chemotherapeutic agents against bacterial wilt of Potato.]—*Parasitica*, **16**, 4, pp. 126–139, 1960.

In tests at Sta. de Rubona (I.N.É.A.C.) and the Faculté d'agronomie d'Astrida, Ruanda-Urundi, [Congo], on the chemical control of *Pseudomonas solanacearum* [cf. **39**, 494], the activity of many antibiotics, sulphamides, and fungicides (results obtained with which elsewhere are reviewed) was studied *in vitro*, after which the cyclotropic activity of the most effective was assessed; this was followed by the disinfection of previously inoculated tubers by immersion for 75 min. in solutions of selected fungicides and antibiotics, followed by drying and planting.

The results demonstrated that thiram and phenylmercurytriethanol ammonium lactate at the usual concs. gave satisfactory protection to previously infected tubers

and markedly accelerated emergence. Of the antibiotics tested, actinomycin and, to a less extent, chloromycetin, gave promising results.

MONTUELLE (B.). **Localisation cytologique des bactéries présentes dans les tubercules de Pomme de terre.** [Cytological localization of the bacteria present in Potato tubers.]—*C.R. Acad. Sci., Paris*, **252**, 3, pp. 452–454, 4 fig., 1961.

The detection of bacteria in potato tubers free from known bacterial diseases has been reported from the Inst. bot., Lille (*Bull. Soc. bot. Nord Fr.*, **12**, pp. 140–144, 1959). In further experiments multiplication of the bacteria was induced by immersing sterilized tubers either in nutrient bouillon or in a bath of paraffin, boiling for the 1st 2 soaks and then reducing to 50° C.; in both methods the tubers were subsequently left for 8 days before fixing in mixture of CrO_3 and bichromate and staining with rubin S and Volkonsky's blue.

In the bouillon material only were certain cells of small cocci, coloured blue, frequently grouped in circular colonies and united by a kind of mucilage; they apparently tended to develop round the periphery of the cell and near the starch grains. In the paraffin material 1 20 rod-shaped elements, stained red and resembling bacteria, were seen here and there; in general, where they were abundant the starch grains had disappeared.

ADSUAR (J.). **Field behaviour of certain Sweetpotatoes to mosaic in Puerto Rico.**—*J. Agric. Univ. P. R.*, **44**, 4, pp. 251–253, 1960.

At the Dept Phytopath., agric. Exp. Sta., Rio Piedras, 6 of the best commercial sweet potato vars. were found to be susceptible to mosaic [virus: **34**, 812] when inoculated by root grafts. When alternate healthy and virus-infected rows were planted no virus symptoms were found in the mosaic-free rows at the end of Apr. It is suggested that this may be due to a relationship between the virus and vector similar to that described in the U.S.A. [**38**, 767].

JOHN (K. P.). **Loss of viability of three root parasites in infected root sections buried in soil.**—*J. Rubb. Rest. Inst. Malaya*, **16**, 4, pp. 173–177, 1 diag., 1960.

Further tests of the survival of *Fomes lignosus* [**38**, 335], *F. noxius*, and *Ganoderma pseudoferreum* [**40**, 244] in buried root sections of rubber demonstrated that the rate of disintegration and the resultant loss of viability of the fungi depended on the size of the root, to which rate of loss was inversely related. Pieces used as inocula disintegrated much more rapidly where the soil was shaded, richer in organic matter, and penetrated by roots.

The most significant result was the very marked effect of soil conditions on the rate of disintegration. While the burial experiment showed that the fungi can persist for up to 4 yr. in roots 3 in. diam., the inoculation experiments indicated how much more quickly decay can proceed when the area is planted with rubber and cover crops; *F. lignosus* was no longer viable in the largest root sections used as inocula after 12–15 months. It is concluded that root fragments left after clearing old rubber are not likely to offer more than a passing risk, even if diseased. A good ground cover should be established without delay, to hasten the decay of root fragments.

Reports of the Division of Entomology and Pathology. Disease investigations.—*Rep. Bur. Sug. Exp. Stas Qd* 60, pp. 66–90, 18 fig., 1960.

Following the general report (pp. 66–71) by R. W. MUNGOMERY [cf. **39**, 344], G. C. HUGHES notes (pp. 80–90) that hot-water treatment or surface sterilization of sugarcane setts with $HgCl_2$ had no effect on the subsequent incidence of chlorotic streak virus. Preliminary experiments have demonstrated the possibility of transmitting the virus by inoculation into the roots. For the 1st time no outbreak of Fiji virus disease was reported from any commercial plantings.

Heat treatment of infected canes for 3 hr. at 50° C. was not sufficient to kill *Xanthomonas albilineans* completely, though the pathogen was killed in a water or cane juice suspension after 20–30 min. at 50°.

Severe infections of yellow spot (*Cercospora koepkei*) [**40**, 125] in the vars. Eros and Luna led to reduced planting of these.

Yellow blotches of unknown origin appeared on the leaves of the newly introduced C.P. 52/57 during the autumn and winter and the plants were destroyed. A weakly pathogenic, unidentified fungus was isolated from Q. 67 and Trojan; primary shoots in plant cane developed whitish markings with red stripes towards the base and top of the sheaths, which are shorter and stiffer than in healthy plants. Older leaves die prematurely and the tops have a fan-like appearance. White mycelium may extend for several nodes above the attachment of the stalk to the original sett. The roots are frequently rotted and the stems invaded to varying degrees. The disease occurs in patches in both irrigated and non-irrigated fields.

Velvet beans [*Mucuna deeringiana*] in several localities were affected by *Phytophthora drechsleri* [**37**, 308] in 1959–60 and this pathogen is now firmly established in N. Queensland.

ANTOINE (R.). **The thermotherapy of Sugar Cane plants infected with chlorotic streak disease.**—*Rev. agric. sucr. Maurice*, **39**, 4–5, pp. 321–327, 1 graph, 1960.

After a general review the author recapitulates the results of his own experiments and those of other workers [cf. **38**, 768, *et passim*]. He suggests that a study of the effect of heat treatment on growing plants derived from affected setts might lead to a better understanding of the virus–host relationship and throw light on the apparent recovery of infected plants under various conditions.

LAUFFENBURGER (G.). **La lutte contre la maladie de Fidji de la Canne à sucre à Madagascar.** [The control of Fiji disease of Sugarcane in Madagascar.]—*Rev. agric. sucr. Maurice*, **39**, 4–5, pp. 198–219, 1 map, 1960.

From this critical review it is concluded that very good progress has been made in the elimination of Fiji virus disease [cf. **38**, 625, *et passim*]. It is still present in the E. coast area, but the much more important plantings on the N. slopes of Grande Île are unaffected, as are those in Mauritius and Réunion, where the economic effects of the disease would be incalculable. Spread in Madagascar is slowing down and it is hoped that by the end of 1960 the disease will be confined to the industrial plantations. Infection is declining in the Brickville area, where the resistant Pindar is replacing M 134/32. Varietal resistance trials are in progress and insecticidal spraying and roguing are regularly practised.

BAUDIN (P.). **Observations sur les nouvelles galles foliaires de la Canne à sucre à Madagascar.** [Observations on the new leaf galls of Sugarcane in Madagascar.]—*Rev. agric. sucr. Maurice*, **39**, 4–5, pp. 220–228, 5 fig., 1960.

'Pseudo-Fiji' disease [**39**, 734] has been found on the island of Nossi-Bé and in the districts of Ambanja and Ambilobe on the W. coast of Madagascar. Galls form on the lower surface of the leaves, along the secondary veins, the midrib, and sometimes the leaf sheath; they are often grouped at the base of the blade or may project from a vein at the leaf edge. The veins are slightly hypertrophied for distances of up to 20 cm. or more, and in places from 1 mm. to 1 or 2 cm. apart excrescences form, reaching several mm. diam. The largest resemble pearls or drops of water suspended on a vein and they may join together at the ends; some resemble a papilla. The galls tend to be pale yellow or white, often with a brown, necrotic spot in the centre, which may enlarge, the whole protuberance sometimes turning brown. The largest galls deform the veins, but the general shape of the leaf is unaffected.

At present, the condition is of no economic importance. It differs from true Fiji disease morphologically and histologically. The galls are formed essentially by hypertrophy and hyperplasia of the bundle sheath, though the vessels may be considerably enlarged. The origin of the disorder is not known.

Hudson (H. J.). **Pyrenomycetes of Sugar Cane and other grasses in Jamaica. 1. Conidia of Apiospora camptospora and Leptosphaeria sacchari.**—*Trans. Brit. mycol. Soc.*, **43**, 4, pp. 607–616, 1 pl. (9 fig.), 2 fig., 1960.

A description is given of *A. camptospora* on stems and leaves and its conidial state *Papularia vinosa*. The conidial state of *L. sacchari*, also described, is referable to *Phyllosticta*; many other fungi, some of which are listed, were found associated with early ring spot lesions on sugarcane.

D'Emmerez de Charmoy (D.). **Un aspect imprévu de la gommose à la Réunion.** [An unexpected aspect of gumming disease in Réunion.]—*Rev. agric. sucr. Maurice*, **39**, 4–5, pp. 229–236, 1960.

Gumming disease [*Xanthomonas vasculorum*: **39**, 620] of sugarcane reappeared in Réunion with all its former severity after a cyclone in 1958. The present outbreak differs from earlier ones in respect of varietal resistance, geographical distribution, and the exceptional severity of leaf infection.

Mulder (C.). **Planting on Poria-infected areas.**—*Tea Quart.*, **31**, 3, pp. 106–109, 2 pl., 1960.

Areas infected by *P. hypolateritia* [**34**, 489] to be replanted with tea should be kept under Guatemala grass long enough to starve the remaining *P.* mycelium, which can be detected by planting with the very susceptible *Tephrosia*. Improving the organic matter content of the top soil will encourage the growth of *Trichoderma viride*, strongly antagonistic to *P.* in culture, and may thus lessen the danger of infection.

Sarmah (K. C.). **Canker.**—*Two & a Bud* (*News Lett. Tocklai exp. Sta.*), **7**, 3, pp. 21–22, 1960.

Among the fungi causing cankers of tea, which are briefly described, are *Macrophoma theicola* [**39**, 123], *Nectria* sp., *Hypoxylon asarcodes* (tarry root rot), and *Phomopsis* sp. (collar rot). The most common cause of canker on tea in N.E. India is sun scorch [**37**, 678].

Linden (M. I.). Испытание токсичности сока мозаичных растений Табака. [Testing the toxicity of Tobacco plants infected by mosaic.] –Труд. Инст. Генет. [*Trud. Inst. Genet.*], *1960*, 27, pp. 382–386, 1 fig., 1960.

A retardation in development occurred when germinating and dry tomato seed was placed in sap of healthy tobacco plants and of plants infected by tobacco mosaic virus. Sap acidity and osmotic properties were similar in healthy and infected plants, and there appeared to be no difference in their effect on tomato shoots. Sap was still inhibitory after boiling but not after dialysis. A dialysed preparation of purified virus also had no effect on shoot development. It is concluded that the factor responsible is a low-molecular non-protein.

Snegirev (D. P.) & Degtyareva (Mme A. P.). Об антивирусных свойствах высших растений. [On the anti-virus properties of higher plants.]—Труд. гос. Никитск. бот. Сада [*Trud. gos. Nikitsk. bot. Sada*], *1959*, 30, pp. 41–45, 1959. [Engl. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 18, p. 172, 1960.]

The anti-tobacco mosaic virus effects of 263 plants (64 fam.) growing on the S. shore

of the Crimea were studied. The anti-virus properties [cf. **35**, 724] fluctuated not only within fam. and gen., but according to the different parts of the plant. Of 50 conifers, Cupressaceae had the highest anti-virus properties, and of 213 angiosperms the Aceraceae,Celastraceae, Fagaceae, Myrtaceae, &c.

Rŷzhkov (V. L.), Terekhova (Mme N. A.), and Loĭdina (Mme G. I.). О причинах устойчивости Табака сорта амбалема к вирусу мозаичной болезни Табака. [On the causes of resistance to Tobacco mosaic virus in the Tobacco var. Ambalema.]—*C.R. Acad. Sci. U.R.S.S.*, **134**, 6, pp. 1453–1456, 1960.

Sap from Ambalema plants [**38**, 422; **39**, 243] was not more effective in inactivating TMV than that from the susceptible Samsun. Proteins from both vars. reduced the virus titre by 50%, but they did not differ noticeably in their ability to inactivate TMV. The accumulation of TMV in Ambalema was only slightly less at 18 than 24° C.; in Samsun leaves it was much more dependent on temp., and therefore the difference of virus titre in the leaves of these vars. becomes especially noteworthy at 24-27°. Ambalema plants have a poorer development than Samsun, possibly due to a deficiency mutation dependent on temp. Lowering temp., however, cannot raise the virus titre to a high level, as the multiplication of TMV is linked with its own opt. temp. Resistance, therefore, may be due to the virus not being able to find a sufficient quantity of the required metabolites in the host.

Huang (T.-L.) & Huang (C.-S.). **Some preliminary studies on the use of Tobacco stalks relating to soil survival of Tobacco common mosaic virus in farm practice.** —*Rep. Tob. Res. Inst. Taiwan, 1960*, pp. 158–168, 1960. [Chin., Engl. summ. *Tob. Abstr.*, **4**, 10, pp. 579–580, 1960.]

Information collected by the Taiwan Tobacco and Wine Monopoly Bureau indicated that tobacco stalks, a valuable source of revenue, contained considerable amounts of mosaic virus which constituted a potential reservoir of infection. During Sept. 1959–Feb. 1960 the local-lesion method was used on *Nicotiana glutinosa* and the resistant var. Vamorr 48 to determine the quantity of virus in an inoculated crop and its virulence.

The virus could be destroyed by burning the stalks and removed by rinsing fresh material in water. Rain may act in the same way. Stalk tissues decomposed very slowly on the surface of fields, retaining their infectivity for more than 3 months. Cut and ploughed in, therefore, they may serve as an important source of subsequent infection. When fresh stalks were used for making compost or manure, over 90% of the virus was inactivated. Inoculum from tobacco stalks exposed to sunlight for 12 days caused practically no lesions on the indicators.

Aubert (O.). **Les viroses du Tabac en Suisse.** [Tobacco viroses in Switzerland.]—*Mém. Soc. vaud. Sci. nat.*, **12**, 5 (77), pp. 153–211, 4 pl. (23 fig.), 1960. Fr. 4. [Engl. summ. 103 ref.]

At the Stations Fédérales d'essais agricoles de Lausanne potato viruses X and Y, and tobacco, cucumber, and lucerne mosaic viruses were isolated from Swiss tobacco plantings. Virus Y [cf. **40**, 247] occurred as the typical str., harmless to tobacco, and as the necrotic str. causing tobacco veinal necrosis [cf. **39**, 532]. Up to 1957 this necrotic str. attacked only Burley, but later a variant appeared which infected the hitherto resistant Mont-Calme Brun and Mont-Calme Jaune. The dilution end-point of the necrotic str. was 1/100,000, and the longevity *in vitro* 30–70 days; it was inactivated at 60° C. and was not seed-borne.

Tobacco mosaic virus [cf. **32**, 302] was rare; it was never found in Burley R. Cucumber mosaic virus was very widespread and somewhat damaging, 1 str. causing a fine mosaic, another (rare) a mosaic resembling that caused by TMV virus, and a 3rd (very virulent) inducing a white mosaic. Lucerne mosaic virus [cf.

39, 450] was moderately prevalent and did some damage, and potato virus X very rare and unimportant.

From an economic viewpoint potato virus Y was the most injurious.

Hirth (L.). **Contribution à l'étude de quelques problèmes posés par la multiplication du virus de la mosaïque du Tabac.** [A contribution to the study of certain problems presented by the multiplication of Tobacco mosaic virus.]—*Rev. Path. vég.*, **39**, 2, pp. 50–132, 4 fig., 32 graphs; 3, pp. 133–163, 10 fig., 8 graphs, 1960. [Engl. summ. 103 ref.]

This account gathers together studies (begun in 1949) on virus multiplication as a function of the physiological behaviour of the parasitized cells [**38**, 226] and is in 3 parts: the 1st covers materials and methods, the 2nd the multiplication of the virus in different types of tobacco tissues [**40**, 383], and the 3rd comparative virulence of virus from tissue cultures and leaves: virulence and inhibition of infection; pathogenicity and synthesis of the protein and ribonucleic fractions; and comparative structure of the virus from cultures and leaves. The aim throughout was to compare multiplication in tissue cultures *in vitro* and in leaf disks in different media. The mechanism of synthesis of the 2 virus fractions is probably not the same, that of the protein fraction being superimposed on that of the normal proteins of the host, while the ribonucleic part is obtained from RNA of the invaded cell. The processes involved in the multiplication of the virus in the leaves and the cultures did not appear to be identical. The virus–cell relationship changes during the life of the cell, and the virus from tissue cultures is, at a given conc., less virulent than that from leaves. The studies described in part 3 lead to the conclusion that the reduction in pathogenicity in the former is attributed to longitudinal aggregation of the virus particles. The work made apparent the variety and variability of the virus–cell relationships and revealed also a certain plasticity in the elementary particle of the virus.

Buchinskiĭ (A. F.), Volodarskiĭ (N. I.), & Asmaev (P. G.). Табаководство. [Tobacco growing.] 396 pp., illus., Moscow, Sel'khozgiz, 1959. Roubles 6.70. (2nd, revised, ed.)

A sect. (pp. 104–109) by A. F. Buchinskiĭ, deals with immune vars. In the selected eastern cigarette group, the following regional vars. now in use have complex resistance to tobacco mosaic virus [**38**, 243] and powdery mildew [*Erysiphe cichoracearum*: **39**, 625]: Trapezond 161 in Kazakhstan, Kirghizia, and Uzbekistan, American 287 in the Crimea and the Samarkand region, Dyubek 7 in Uzbekistan, and Dyubek 566 in Kazakhstan. A sect. on diseases (pp. 278–292) by N. I. Volodarskiĭ gives details of pathogens and control.

Cruickshank (I. A. M.) & Mandryk (M.). **The effect of stem infestation of Tobacco with Peronospora tabacina Adam. on foliage reaction to blue mold.** *J. Aust. Inst. agric. Sci.*, **26**, 4, pp. 369–372, 3 graphs, 1960.

In further glasshouse experiments at Div. Plant Industry, Canberra [**40**, 247], when a spore suspension of *P. tabacina* was injected into tobacco stems, an anti-sporulation effect occurred in the leaves (sprayed with a spore suspension) after 14 days which reduced sporulation intensity by 68% though the full effect did not become apparent until 28 days after the injection. When the foliage was sprayed with spore suspension 21 days after stem injection, stem symptoms were typical of mild infection and foliage symptoms were greatly reduced in extent and severity, 38% of the leaves remaining apparently healthy. Field trials indicated that stem injection 44 and 53 days after transplanting significantly reduced foliage infection resulting from leaf inoculation 7 days after the final stem injection. The results of all the experiments confirmed the field observation that change in foliage reaction

to blue mould occurs in stem-infected plants, but the mechanism involved is as yet unknown.

ZANARDI (D.). **La 'muffa blu' del Tabacco. Storia, biologia, danni, e difese.** [Blue mould, *Peronospora tabacina*, of Tobacco. History, biology, damage, and control.]—*Ital. agric.*, **97**, 11, pp. 1075–1086, 1 col. pl. (6 fig.), 5 fig., 1 map, 1960. [28 ref.]

An interesting review with special reference to Italy [cf. **40**, 324].

NITZANY (F. E.). **Tests for Tobacco mosaic virus inactivation on Tomato trellis wires. Transmission of Tobacco mosaic virus through Tomato seed and virus inactivation by methods of seed extraction and seed treatments.**—*Ktavim* (*Quart. J. nat. Univ. Inst. Agric.*) [formerly *Rec. agric. Res. Sta. Rehovot, Israel*], **10**, 2, pp. 59–61, 63–67, 1960.

Tobacco mosaic virus on tomato trellis wires [cf. **40**, 187] was inactivated by dipping them in 0·1% NaOH for 10 min., 5% trisodium phosphate for 5 min., or 1% formalin for 1–5 min., or by heating to 130° C. for 15 min. Detergents were not sufficient for complete inactivation.

Tomato seed [cf. loc. cit.] was freed from infection by the acidification process of seed extraction [cf. **30**, 590] if carried out at 30° C., or by dipping seed in 10% trisodium phosphate for 15 min. [cf. **35**, 553]. If the latter treatment was followed by rinsing in running water for 5 min. germinability was not impaired.

NITZANY (F. E.) & WILKINSON (R. E.). **The identification of some viruses affecting Tomatoes in Israel.**—*Ktavim* (*Quart. J. nat. Univ. Inst. Agric.*) [formerly *Rec. agric. Res. Sta. Rehovot, Israel*], **10**, 2, pp. 91–96, 1 fig., 1960. [19 ref.]

In a survey of all tomato-growing areas in Israel from 1957–59 in which 150 samples were indexed tobacco mosaic virus alone was found in 50% and potato virus Y alone in 15%, while a mixture of the 2 occurred in 20%. From a few plants cucumber mosaic virus was obtained.

MERRETT (M. J.). **The respiration rate of Tomato stem tissue infected by Tomato aucuba mosaic virus.**—*Ann. Bot., Lond.*, N.S., **24**, 94, pp. 223–231, 1960.

At the Dept Bot., Univ. Exeter, the respiration rate of thin slices of Stonor's Moneymaker tomato stem tissue infected by tomato aucuba mosaic virus was lower than that of healthy tissue when equal numbers of respiratory systems were compared. Respiration rates expressed in terms of fresh or dry wt. were not satisfactory criteria since these units contained varying numbers of respiratory systems in healthy and infected tissue.

MCKEEN (C. D.). **An occurrence of Tomato ringspot virus on greenhouse Cucumber in Ontario.**—Abs. in *Proc. Canad. phytopath. Soc.*, **27**, pp. 14–15, 1960.

In Apr. 1957 Burpee hybrid cucumbers in greenhouses at Kingsville, Ont., were attacked by 2 strs. of tomato ring spot virus [**38**, 386], 1 of which was invariably lethal regardless of plant age. The viruses were transmitted by handling the plants. Symptoms included brownish necrotic areas spreading through the leaves along the veins and oily-looking areas most conspicuous near the nodes.

KHALACHEV (P.). Предпазване на оранжерийните Домати от стъбленото загниване. [Protection of glasshouse Tomatoes from stem rot.]—Градинарство [*Gradinarstvo*], **2**, 9–10, pp. 41–42, 1960.

A note on control measures for tomato stem rot, caused by *Didymella lycopersici* [map 324], alone or in combination with *Phytophthora parasitica* and *P.* sp., from D.Z.S., Mineralni bani, Khaskovsko, Bulgaria.

Stall (R. E.). **Development of Fusarium wilt on resistant varieties of Tomato caused by a strain different from race 1 isolates of Fusarium oxysporum f. lycopersici.**—*Plant Dis. Reptr*, **45**, 1, pp. 12–15, 1 fig., 1961.

An outbreak of *Fusarium* wilt on tomato vars. which had hitherto been resistant to race 1 of *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* [**39**, 127] was reported to Fla agric. Exp. Sta. From the diseased plants a new str., to which all vars. having the *Lycopersicon pimpinellifolium* Acc. 160 factor for resistance were susceptible, was cultured. Some tomato lines resistant to race 2 [loc. cit.], however, were resistant to the new str.

Salerno (M.) & Calabretta (C.). **Grave infezione da Phytophthora citricola Sawada (= P. cactorum var. applanata Chester) su piantine di Pomodoro in Sicilia.** [Severe infection by *P. citricola* of Tomato seedlings in Sicily.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **18**, pp. 222–233, 2 pl. (7 fig.), 1 fig., 1 graph, 1960. [Engl. summ.]

In Jan. 1959 Marmande nano tomato seedlings growing in the open on the S. coast of Sicily developed a basal rot followed by rapid wilting caused by *P. citricola* [**37**, 148], which is described. This is the 1st record of the fungus from the Mediterranean area and the 1st report of it as parasitic on tomato. The fungus was virulently pathogenic to tomato, apple, orange, and lemon fruits.

Darby (J. F.). **Evaluation of treatment for the control of soil-borne pests of Tomato.**—*Plant Dis. Reptr*, **45**, 1, pp. 58–61, 1 fig., 1961.

At Central Fla Exp. Sta., Sanford, application of methyl bromide and methyl bromide–chloropicrin formulations (by Dow Chem. Co.) with a tractor-mounted spraying device which sprayed the plots and then covered them with 2-mil. polyethylene film in one operation, provided excellent control of damping-off fungi as well as weeds and nematodes.

Braithwaite (B. M.) & Blake (C. D.). **Low gallonage application for pest and disease control in Tomatoes.**—*J. Aust. Inst. agric. Sci.*, **26**, 4, pp. 358–360, 1960.

In 1959 at Dept Agric., Murwillumbah, N.S.W., plots of Rouge de Marmande winter tomatoes given a semi-concentrate spraying treatment (10 oz. Cu oxychloride, 7 fl. oz. 25% DDT emulsified concentrate, and 12 fl. oz. white oil in 2 gal. water) at 4–20 gal./acre (according to crop maturity) yielded 6,583 lb. (= 43,450 lb./acre), a yield 46% above that from oil concentrate plots (2 pints unemulsified mineral oil instead of the white oil and no water) at $\frac{1}{2}$–3 gal./acre, and 125% above that from the untreated. The evidence obtained suggests that satisfactory control of *Septoria* leaf spot [*S. lycopersici*] and mild early blight [*Alternaria solani*] will be given by fungicides suspended in relatively small quantities of water, which gave better coverage than the concentrated formulation, and less burning.

Schicke (P.). **Die Wirksamkeit von elektrostatisch geladenem Fungizidstaub im biologischen Test.** [The effect of electrostatically charged fungicidal dust in a biological test.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 9, pp. 135–138, 1 fig., 1960.

In further experiments by Plant Prot. Dept, C. H. Boehringer Sohn, Ingelheim a. Rhein, Germany [cf. **35**, 401], H. Göhlich's technique (cf. *Meded. LandbHogesch. Gent*, **24**, pp. 1051–1059, 1959), ensuring fine uniform dispersion of the charged particles of the fungicide, was used against *Phytophthora infestans* on inoculated tomato seedlings. The treatment was more effective with the charged dithane dust-Cela (8% zineb) at 15 and 25 kg./ha. than with the uncharged. Compared with dithane-Cela (80% zineb) sprays at 0·1 and 0·2%, the charged dust was more

effective on the lower leaf surface, equal on the upper surface normally, and inferior on the upper surface after exposure to wind (6 m./sec. for 1 hr.) and rain (20 mm.). For use in the field the risk of wash-off and of the loss of the charge at 80% R.H. should be taken into account.

EBBEN (M[ARION] H.). **Brown root rot of Tomatoes. III. The bacterial flora of the rhizosphere.**—*Ann. appl. Biol.*, **48**, 4, pp. 817–823, 5 graphs, 1960. [17 ref.]

In further work at the Glasshouse Crops Res. Inst., Rustington, Sussex [cf. **38**, 546], population counts and nutritional grouping of bacteria from a tomato-sick soil in a commercial glasshouse where tomatoes had been grown for 30 yr. showed that steaming greatly reduced the bacterial population and the percentage of bacteria able to use inorganic N. Later the number increased and by the time tomatoes were planted the distribution of the 5 nutritional groups (cf. Taylor, *Proc. Soc. appl. Bact.*, **14**, p. 101, 1951) approximated to that in unsteamed soil. Rhizosphere and root-surface population numbers were not very different in steamed and unsteamed soils. The nutritional groups in soil before planting differed much more as between samples from steamed soil with a changing population than as between those from soil not steamed for 3 yr. Groups I and II (bacteria able to use inorganic N and requiring amino acids, respectively) were higher in unsteamed, cropped soil than in steamed soil and were dominant in rhizosphere and root-surface populations. Group I increased on the root surface in unsteamed soil from July–Oct., whereas group II increased on root surfaces in steamed soil. Group V (requiring soil extract) was less frequent on the root surface than in soil from plots not steamed for 1 yr. but more so than in soil unsteamed for 3 yr.

Differences in the bacterial populations which could be correlated with the development of brown root rot were not observed. The rapidity with which symptoms developed, even on steamed soil, suggested that differences between the rhizospheres of healthy and affected roots would be apparent only at an earlier stage of plant growth.

SLEPNEVA (Mme G. S.). Перспективные сорта Томатов для Красноярского края. [Promising Tomato varieties for the Krasnoyarsk area.]—*J. agric. Sci., Moscow*, **5**, 9, pp. 76–78, 1960.

Among tomato vars. recommended is Hybrid no. 39 from the selection of the Byelorussian sci. Res. Inst. for Fruit, Vegetable, and Potato growing, resistant to bacterial black spot [*Xanthomonas vesicatoria*: cf. **38**, 228]. Medium resistant are Sibirskiĭ skorospelŷĭ 1450, Losinoostrovskiĭ 276, Mnogoplodnŷĭ 40, and Hybrid no. 19.

KORENYAKO (A. I.) & KOVESHNIKOV (A. D.). Поиски антибиотических веществ актиномицетов против опухолей Томатов, вызываемых **Ps[eudomonas] tumefaciens.** [The search for antibiotic substances from actinomycetes against tumours in Tomato caused by *Agrobacterium tumefaciens*.]—*Bull. Acad. Sci. U.R.S.S.*, **25**, 5, pp. 746–752, 4 fig., 1960. [Engl. summ.]

At Inst. Microbiol., Acad. Sci. U.S.S.R., many of the ca. 1,000 cultures of actinomycetes from different soils of the Soviet Union were found to depress *A. tumefaciens* [cf. **35**, 513], especially those spp. antagonistic to Gram — bacteria. Crude preparations of the antibiotics were obtained from the most active strs., max. production being in liquid medium with fish extract. On young tomato plants all of the same age infected at the same time with a drop of a 2-day-old broth culture suspension introduced into a wound on the stalk, culture liquids of *Actinomyces rimosus*, *A. aurantiacus*, and *A.* sp. P42 destroyed 15–29-day-old tumours, other filtrates being effective only with 15–17-day-old tumours. Of the known antibiotics tested only terramycin disrupted 5–10-day-old tumours. The culture liquid of many

actinomycetes was more actively effective against developing tumours than chemically pure antibiotics, but required direct contact with the tumour.

Matŷshev'ska (Mme M. S.). Зміни в інтенсивності дихання і активності окисних ферментів у різних по стійкості сортів Томатів під впливом зараження **Xanthomonas vesicatoria.** [Changes in the intensity of respiration and the activity of oxidizing enzymes in Tomato varieties with different resistance under the influence of infection by *X. vesicatoria.*]—*J. Microbiol., Kiev,* **22,** 5, pp 38–44, 1 fig., 4 graphs, 1960. [Russ. summ.]

The level of respiratory activity in inoculated tomato plants was related to resistance: max. in Break o' Day was 121–138% over the uninoculated and in the more resistant Sovetskiĭ 132–166% [cf. **38**, 228]. Ascorbic oxidase activity in Sovetskiĭ was less than that in Break o' Day throughout the test. Peroxidase activity in the leaves of both vars. increased on penetration; the somewhat higher activity in Break o' Day can be explained by a varietal difference in the plant's enzyme system. Inoculation of Break o' Day produced a reduction of polyphenoloxidase activity, especially during the early development of infection. The defence activity of polyphenoloxidase was more pronounced in Sovetskiĭ.

Tomato spotted wilt.—*Adv. Leafl. Minist. Agric. Fish., Lond.*, 238, 6 pp., 1 col. pl., 3 fig., 1949. 3*d.*

A revised summary of symptoms, spread, host range, and control.

Exotic forest trees in Great Britain.—*Bull. For. Comm., Lond.*, 30, vii+167 pp., 17 pl., 1959. 17*s.* 6*d.*

In this 2nd amended impression of a paper prepared for the 7th British Commonwealth Forestry Conference, Australia and New Zealand, 1957, parts 2 and 3, dealing with exotic conifers and deciduous trees, respectively, include notes contributed by T. R. Peace on diseases and general pathology of some spp.

Forestry practice.—*Bull. For. Comm., Lond.*, 14, vi+93 pp., 4 fig., 1959. 5*s.* 6*d.*

An amended 2nd impression of the 7th ed. (1958) in which the chapt. on diseases has been re-drafted by T. R. Peace. References to Forestry Commission Leaflets dealing with some of the common diseases in greater detail are included.

McKay (Hazel H.) & Lentz (P. L.). **Descriptions of some fungi associated with forest tree decay in Colorado.**—*Mycopathologia*, **13**, 4, pp. 265–286, 7 fig., 1960. [26 ref.]

Descriptions of the basidiocarps and of cultures of *Helicobasidium corticioides, Corticium radiosum, Peniophora luna, P. polygonia*, and *P. rufa*, associated with decay of forest trees in Colorado [cf. **37**, 601]. The 1st 3 spp. attack conifers, the last 2 aspen (*Populus tremuloides*).

Klyushkin (P. I.). Болезни орехоплодных пород. [Diseases of nut trees.]—*Ex* Культура орехоплодных [The cultivation of nut trees], pp. 397–407, 2 fig., Moscow, Sel'khozgiz, 1957.

Among the diseases considered [not specifically in U.S.S.R.], with brief descriptions of the pathogens and control, are *Pseudomonas* [*Xanthomonas*] *juglandis* on walnut, *Polystigma rubrum* and *Clasterosporium carpophilum* on almond, and *Rosellinia necatrix* on pistachio nut.

Moriondo (F.). **Una nuova malattia dell' Ontano in Toscana.** [A new disease of Alder in Tuscany.]—Reprinted from *Ital. for. mont.*, **13**, 5, 6 pp., 4 pl. (12 fig.), 1958. [Fr. summ. Received Feb. 1961.]

Studies at Univ. Florence, Italy, on a serious disease of alder in a forest at

Garfagnana are described. Round, usually elongated, sometimes spindle-shaped cankers (up to 20 cm. long) appeared on the trunk. Wound cambium formed at the circumference of the lesion and the bark over it dried up. Cankers in the centre of a large, necrotic area also formed on the shoots. Frequently, large, superficial, reddish, necrotic areas developed on the bark, mainly at the base of the shoots, the dead bark becoming lacerated. In winter new areas of necrosis appeared, reddish patches 2–3 cm. wide forming. The wood sometimes died. The disease appeared to be very virulent, in some cases killing the tree. From recently affected parts only bacteria were isolated, while from areas where the bark had been dead for some time fungi were mostly obtained. The disease is thought to be due to bacteria. Further investigations are in progress.

Quispel (A.). **Symbiotic nitrogen fixation in non-leguminous plants. V. The growth requirements of the endophyte of Alnus glutinosa.**—*Acta bot. neerl.*, **9**, 4, pp. 380–396, 1 graph, 1960.

At Univ. Amsterdam the growth *in vitro* of the endophyte of *A. glutinosa* [cf. **38**, 488] was studied by determining the infective capacity (amount of nodules formed on test plants) of nutrient solution inoculated with nodule extracts. Growth occurred only when an alcoholic extract of *Alnus* roots was added to the nutrient solutions. The number of nodules formed was 5–50, compared with a max. of 2 when a nutrient in which no growth occurred was used. Growth of the endophyte was inhibited by materials formed during the autoclaving of glucose and by yeast autolysate. Peptone was indispensable. There were indications that growth was stimulated by a water-soluble factor present in *Alnus* nodules. Max. growth was obtained only after 2–3 weeks. In an infective culture clusters of very thin hyphae were visible under the microscope.

Gibson (I. A. S.). **Armillaria mellea in Kenya forests.**—*E. Afr. agric. for. J.*, **26**, 2, pp. 142–143, 1960.

In further studies [cf. **39**, 509] evidence was obtained that in some areas bamboo (*Arundinaria alpina*) formed natural associations with *A. mellea* which may serve as a reservoir of infection for susceptible forest crops.

Salerno (M.). **Cytospora corylicola Sacc. e patogenesi del 'mal dello stacco' del Nocciolo (Corylus avellana L.) in Sicilia.** [*C. corylicola* and the pathogenesis of bark-flaking disease of Hazel Nut (*C. avellana*) in Sicily.]—*Riv. Pat. veg., Pavia*, Ser. 3, **1** (*1961*), 1, pp. 38–64, 3 pl., 2 graphs, 1960. [Engl. summ. 13 ref.]

After describing the symptoms of *C. corylicola* [**40**, 251] on hazel-nut trees the author gives the results of biological studies on the causal organism. Inoculations of the trunks of hazel-nut trees during a year showed the fungus to be a wound parasite [cf. **32**, 286] causing infection only from the end of May until the end of Aug.

Caroselli (N. E.). **Verticillium wilt of Smoke bush.**—*Plant Dis. Reptr*, **45**, 1, pp. 24–25, 1 fig., 1961.

A wilt of smoke bush (*Cotinus coggyria*) has been increasing in Rhode Island in recent years and *V. alboatrum* has been consistently isolated from diseased plants [cf. **39**, 110]. At R.I. agric. Exp. Sta., Kingston, *V. alboatrum* from a number of other hosts proved pathogenic to smoke bush.

Holmes (F. W.). **Recorded Dutch Elm disease distribution in North America as of 1959.**—*Plant Dis. Reptr*, **45**, 1, pp. 74–75, 1 map, 1961.

This report from Univ. Mass., Amherst [cf. **38**, 166; map 36], notes that *Ceratocystis ulmi* on elm has spread further in most areas.

Orłoś (H.). **Venturia tremulae Aderh. — parch Osikowy. Meria laricis Vuill. — opadzina Modrzewiowa.** [*V. tremulae*—Aspen scab and *M. laricis*—Larch

needle cast.] **Cryptodiaporthe populea (Sacc.) But. — pomór Topolowy. Valsa sordida Nit.** [*C. populea*—Poplar die-back and *V. sordida*.]—*Ulot. Inst. badaw. Leśn., Warsz.* 26, 2 pp., 3 fig.; 27, 2 pp., 3 fig., 1959.

These leaflets from the Res. Inst. Forestry, Warsaw, Poland, give information on the development and distribution, symptoms, damage caused, and control of the different diseases. In addition to agrotechnical operations, repeated spraying during the summer with 1% Bordeaux mixture against *V. tremulae* [cf. **39**, 631], 1% Californian mixture [lime-sulphur] against *M. laricis* [cf. **35**, 336; map 379], and 1% Bordeaux or 2% lime-sulphur against *C. populea* [cf. **37**, 252] are recommended for control.

Boyce (J. S.). **Distribution of Ceratocystis fagacearum in roots of wilt-infected Oaks in North Carolina.**—*Phytopathology*, **50**, 10, pp. 775–776, 1960.

Of 23 oaks, root samples of which contained *C. fagacearum* [**40**, 192, 325], apparently only 1 had been infected through a root graft though all were within the root-zones of wilt-infected trees. It is not yet known how the fungus travels from diseased to healthy roots in the soil. Infection was found in many roots at considerable distances from the stem.

Itō (K.) & Kobayashi (T.). **On anthracnose fungi of Rhus verniciflua.**—*J. Jap. For. Soc.*, **41**, 10, pp. 406–411, 10 fig., 1959. [Jap.]

At the Gov. For. exp. Sta., Meguro, Tokyo, 5 inoculation tests with fungi from anthracnose of *Rhus verniciflua*, reported in July 1950 by the Iwate Prefecture For. Inst. to be attacking seedlings, produced partly positive results with *Myxosporium rhois*, *Colletotrichum rhoinum*, and *Colletotrichum* sp. *M. rhois* is the most common and causes considerable losses. Lesions developed on all inoculated *R. verniciflua* seedlings in 1951, and acervuli on most; no difference was noted between atomization and drop inoculation. Lesion formation was indistinct with *C. rhoinum* and in only one seedling did acervuli develop, after 7 days. *M. rhois* induced lesions with the production of acervuli in one inoculation to *R. javanica*. It has previously been known as *C. rhoinum* in Japan.

Baggchee (K.). **The fungal diseases of Sal (Shorea robusta Gaertn.) II. Secondary parasites of Sal.**—*Indian For. Rec.*, N.S. Mycol., **1** (*1954*), 8, pp. 97–184, 39 pl., 199 fig., 1960. [55 ref.]

Following a review of meteorological and other factors affecting sal, detailed descriptions are given in this further contribution [cf. **39**, 632] of 18 hymenomycetes (3 Agaricaceae, 14 Polyporaceae, 1 Thelephoraceae) attacking *S. robusta*, including their biology, pathology, and diagnostic and cultural characters. In addition, the cultural characters of 8 other white rot fungi, facultative parasites in sal forests, are tabulated for comparison. The common names of sap and heart rot fungi of this host are listed.

Cultivation of the Cricket bat Willow.—*Bull. For. Comm., Lond.*, 17, vi+34 pp., 16 pl. (33 fig.), 1 fig., 1958. 5*s*.

In this 2nd edition of a bulletin on all aspects of timber production from *Salix alba* var. *caerulea* chapt. 5 (pp. 10–14) by W. R. Day deals with damage caused by non-pathological agencies, watermark disease (*Bacterium* [*Erwinia*] *salicis*) [**33**, 68], and a number of fungus diseases.

Van den Ende (G.). **Morfologie en parasitair karakter van Septotinia podophyllina.** [Morphology and parasitism of *S. podophyllina*.] —*Tijdschr. PlZiekt.*, **66**, 5, pp. 269–280, 2 pl. (6 fig.), 1960. [Engl. summ.]

A twig dieback and leaf blotch of the *Salix fragilis* cultivar Belgian Red observed

at 3 places in the Netherlands in 1956–7 was caused by a *Septotinia* sp. At the 'Willie Commelin Scholten' Lab., Baarn, 3 isolates from *Salix fragilis*, 2 of *Septotinia podophyllina* from *Podophyllum*, and 3 of *S. populiperda* from *Populus* [cf. **32**, 156] were shown to be of similar morphology and pathogenicity and are considered conspecific with *S. podophyllina*, conidial state *Septotis podophyllinum* [cf. **34**, 684; **39**, 630].

Vitanov (M.). Ролята на конидиоспорите за развитието на антракнозата по Орехa (**Marssonina juglandis Magn.**). [The role of conidiospores in the development of Walnut anthracnose (*M. juglandis*).]—Раст. Защ. [*Rast. Zasht.*], **8**, 4, pp. 43–45, 1960.

At Exp. Fruit-growing Sta. P. Bogdanov, Dryanovo, Bulgaria, summer spores of *M. juglandis* [*Gnomonia leptostyla*: cf. **36**, 559; **39**, 745] caused up to 96% infection of walnut leaves. Infection spread throughout the summer, especially with heavy rainfall, and reached epiphytotic proportions in favourable conditions, even when infection by winter spores had been insignificant.

Jacquiot (C.) & Lapetite (Mlle D.). **Sur la résistance naturelle du bois de quelques conifères exotiques introduits en France aux attaques de champignons.** [On the natural resistance of the wood of some exotic conifers introduced into France to attack by fungi.]—*Rev. Path. vég.*, **39**, 1, pp. 19–33, 1960. [Engl. summ.]

At the Laboratorie de Mycologie du Centre Technique du Bois samples of the outer heartwood of introduced conifers were tested for decay by *Gyrophana* [*Merulius*] *lacrymans*, *Lenzites saepiaria*, *Coriolus* [*Polystictus*] *abietinus*, *Poria vaporaria*, and *Trametes trabea*, in comparison with native spp.

Pinus strobus and *P. cembra* had high resistance to *M. lacrymans* and *L. saepiaria*. *P. laricio* vars. *calabrica* and *corsicana* as well as *P. canariensis* were very resistant to *M. lacrymans* and the durability of the wood of *P. sylvestris* stock was increased by the influence of the *P. laricio* str. On the whole, foreign spp. were as resistant in France as in their native countries.

Bazzigher (G.). **Cronartium asclepiadeum (Willdenow) Fries auf Pinus montana Mill.** [*C. asclepiadeum* on *P. montana*.]—*Phytopath. Z.*, **39**, 4, pp. 327–328, 1 fig., 1960.

C. asclepiadeum [cf. **39**, 636] was found for the 1st time on *P. montana* in Switzerland in the gardens of the Eidg. Anstalt für das forstliche Versuchswesen, Zürich, in May 1960.

Khan (A. H.). **Fungi occurring on Pinus in Pakistan.**—*Mycopathologia*, **13**, 4, pp. 302–320, 26 fig., 1960.

An annotated list, following an introductory note on the 3 hosts, *P. longifolia*, *P. excelsa*, and *P. gerardiana*, of 7 ascomycetes, 44 basidiomycetes, and 1 deuteromycete.

Lemin (A. J.), Klomparens (W.), & Moss (V. D.). **Translocation and persistence of cycloheximide (acti-dione) in White Pines.**—*For. Sci.*, **6**, 4, pp. 306–314, 1 fig., 1 graph, 1960. [24 ref.]

In co-operative experiments by the Upjohn Co., Kalamazoo, Mich., and the U.S. Dept Agric., Missoula, Mont., cycloheximide (120 and 200 p.p.m. in fuel oil) against *Cronartium ribicola* [**39**, 748, *et passim*], applied by a basal stem method [**40**, 254] to pole-sized western and eastern white pines (*Pinus monticola* and *P. strobus*), was detected in needles of unsprayed branches of the former and in the xylem but not the phloem above the site of application, and it persisted in the trunk bark for at

least 2 yr. In eastern white pine translocation was less but the antibiotic was found in the needles of untreated branches.

The presence of the antibiotic was detected by assays of extracts in chromatography paper against *Saccharomyces pastorianus*.

Moriondo (F.). **Alcuni aspetti della epidemiologia della Melampsora pinitorqua Rostr. sulle Alpi Marittime.** [Some features of the epidemiology of *M. populnea* in the Maritime Alps.]—Reprinted from *Ital. for. mont.*, **13**, 3, 8 pp., 3 fig., 1958. [Fr. summ. Received Feb. 1961.]

The author records the spread of *M. populnea* [cf. **37**, 189] on pines in the Maritime Alps and discusses it in relation to local conditions. The different behaviour of the fungus here and in the low-lying forest of Feniglia is fully discussed.

Sato (K.), Shoji (T.), & Ota (N.). **Studies on the snow molding of coniferous seedlings. II. Dark snow blight caused by Rhacodium therryanum Thuem.**—*Bull. For. Exp. Sta. Meguro* 124, pp. 21–100, 12 pl. (32 fig.), 3 fig., 5 graphs, 1960. [Jap. Abs. from Engl. summ. 140 ref.]

In further studies [cf. **38**, 428] at the Tôhoku Branch Sta., Iwate Prefecture, Japan, it was found that *R[acodium] therryanum* caused severe losses of *Cryptomeria japonica*, *Pinus densiflora*, *Abies sachalinensis*, and *Picea jezoensis* seedlings in deep snowfall areas. When the ground has thawed under the snow the mycelium of *R. therryanum* begins developing after 10 days and grows vigorously after 30 days, turning affected foliage dark green to brown. When the snow melts diseased seedlings are covered with grey-dark brown mycelium, but thereafter the mycelial mats do not increase in size. In culture dark chlamydospores, $12–20 \times 6–12\,\mu$, formed. Resistance depended on age, 1-yr.-old seedlings being the most susceptible, though transplanted trees were also frequently affected. Damage was correlated with the extent of the snow and the rapidity of melting.

The fungus grew well over a pH range 4·8–7 (limits 2·2 and 11) and at 15–20° C. (limits −4–30°). Cultures failed to grow in the absence of free O, and were unaffected by sunlight.

By inoculation, 28 conifers and a number of other plants were established as hosts. Fungus mycelium perennated in the soil during the summer. The pathogen was widespread in areas where snow lay for over 80 days. Mycelial development was not reduced by covering inoculated seedlings with a wooden box to prevent them from being bent by the weight of snow. Seedlings kept at 92% R.H. were not attacked whereas a saturated atmosphere was the most favourable for the disease, with a soil moisture content of 40–55%. In the absence of snow seedlings deprived of N and 3 essential elements were very resistant to both *R. therryanum* and *Botrytis cinerea* [loc. cit.]. Under snow dark snow blight was most severe on plots lacking N and P and moderately severe on plots lacking K. Sunlight and low temp. were essential for hardening and inducing resistance in seedlings.

When seedlings and the beds were sprayed with Bordeaux mixture, Sankyo Cu-Hg dust, or fumiron at the beginning of winter the blight was effectively controlled. Bordeaux was more effective and less phytotoxic with the addition of $ZnSO_4$.

Wallis (G. W.). **Survey of Fomes annosus in East Anglian Pine plantations.**—*Forestry*, **33**, 2, pp. 203–214, 1960. [17 ref.]

A more detailed account [**40**, 190].

Shevchenko (S. V.). Опадання хвої — „шютте" — небезпечна хвороба Соснових культур у західних областях УРСР. [Needle cast—'Schütte'—a serious

disease of Pine stands in the western regions of the Ukrainian S.S.R.]—*J. Bot. Acad. Sci. Ukr.*, **17**, 5, pp. 85–92, 1 fig., 1960. [Russ., Engl. summ.]

Data are presented from L'vov Forest techn. Inst. on the epiphytotic development of *Lophodermium pinastri* [**39**, 504] in the Volynskaya, Rovno, L'vov, and northern Ternopol' regions. In flat country the fungus has an annual development cycle on *Pinus sylvestris*; infection occurs in July–Aug., visible sometimes in the autumn as tiny yellow spots, then in spring the needles become reddish-brown and pycnidia are formed. Needles are cast in April–May, apothecia develop, and at the end of June the ascospores begin to emerge.

On *Pinus* [*mugo* var.] *mughus* in the Carpathian mountains the cycle is biennial. Infection occurs in summer, reddening by the autumn of the following year, needle cast in the spring of the 3rd yr., and apothecial formation before the summer. In 5-yr.-old stands the growth increment of infected trees was 2–3 times less than that of healthy and many died. Control measures advocated include the selection of healthy seed and planting material, planting new stands suitable to the forest type, and, particularly, the use of fungicidal sprays [cf. **40**, 67].

Pawsey (R. G.). **An investigation into Keithia disease of Thuja plicata.**—*Forestry*, **33**, 2, pp. 174–186, 1 pl., 2 fig., 1960.

Some of this information on *Didymascella thujina* [**40**, 189] has been noticed [**38**, 713, 715]. The process of infection from inoculation and development of haustoria to the production of apothecia is described. The ability of the incipient apothecia formed in winter to produce primary infection in the spring was very limited [**36**, 624]. It was not possible to induce infection with ascospores washed off the foliage.

Prisyazhnyuk (A. A.). Предпосевное протравливание семян хвойных пород фунгицидами. [Pre-sowing treatment of conifer seed with fungicides.]—Лес. Хоз. [*Les. Khoz.*], **12**, 4, p. 81, 1960.

Granosan and mercuran were tested against diseases affecting conifer seed at establishments of the Byelorussian Forestry tech. Inst. and elsewhere. Treatment of pine seed with granosan (3 g./kg.) raised seedling emergence per ha. above that of the untreated by 56% at the Negorel'skoe exp. Forestry Establishment, 16·7% at the Borisovskoe, and 24·7% at the Molodechnenskoe. Mercuran raised emergence of pine 16%. Positive results were also obtained with Norway spruce and Siberian larch.

Akai (S.) & Ueyama (A.). **Studies on the microbial stain and decay of building boards and their prevention. I. Forced-decay tests of building boards using some wood-destroying fungi.**—*J. Jap. Wood Res. Soc.*, **6**, 3, pp. 128–132, 1960. [Jap., Engl. summ. *Abstr. Bull. Inst. Pap. Chem.*, **31**, 3, p. 314, 1960.]

Phenolic-resin binders compared favourably with melamine resins in the inhibition of fungal degradation of various hard- and wood-particle boards. Of the 5 test fungi used, *Poria vaporaria* caused the max. damage. After 100 days' exposure to any of the fungi the wood-particle boards lost less than 10% of their dry wt. as against up to 50% for the hardboards.

Banerjee (S.) & Naha (P. M.). **Trametes cingulata Berk. in culture.**—*Proc. Indian Acad. Sci.*, Sect. B, **52**, 1, pp. 9–18, 1 fig., 6 graphs, 1960.

At the mycol. Lab., Calcutta Univ., fresh basidiospores of *T. cingulata* [cf. **17**, 88] germinated readily at 30° C. Though the fungus tolerated a wide pH range best growth occurred at 7; the most favourable medium was potato dextrose agar. Bavendamm's oxidase reaction [**8**, 281] was positive.

Boocock (D.). **The prevention of damage to timber by sapstain.**—*Timb. Tech.*, **68**, 2252, pp. 233–235, 4 fig., 1960.

Useful information is presented on the general principles underlying the protection of logs and freshly sawn timber against [unspecified] sap-staining fungi and their application under varied local conditions.

Where continuous immersion in water (the ideal method) is impracticable, the logs can be kept saturated by spraying [**40**, 134] with water (6 mm./hr. according to Swedish experience), with suitable provision for drainage. In other cases the moisture content of the wood should be reduced as rapidly as possible by decortication and stacking with good ventilation. The checks and splits liable to develop at the ends of the drying logs may be prevented by a coating based on bitumen, asphalt, or wax. The fungicide most commonly used for the treatment of logs is pentachlorophenol (2% in oil or emulsion sprays) or Na pentachlorophenate (3–5% aqueous solution).

Newly sawn timber is highly susceptible to sap-stain fungi, and after kiln-drying the wood should be stacked so that it is kept well ventilated and dry, practical advice on this being given. The Na salts of chlorinated phenols and various water-soluble organo-Hg compounds are well established in commercial practice as protectives for green sawn timber, but it is emphasized that they are only supplementary to good seasoning practice and not an alternative to it. The opt. concs. of Na pentachlorophenate required are (approx.): Europe and U.K., 8–10 lb./100 gal., Scandinavia 7–8, and tropical countries 15–20. The acidity of the sap of most timbers, which causes precipitation of insoluble pentachlorophenol, may be counteracted by the addition of a buffering agent, preferably borax, which enhances fungicidal activity and mitigates the irritant action of Na pentachlorophenate on the skin. The organo-Hg compounds generally used as timber dips are ethyl $Hg_3(PO_4)_2$ and ethyl $HgCl_2$.

Full directions are given for the various procedures involved in anti-sap stain dipping, including, e.g. a method for determining the strength of Na chlorophenate solutions, regular renewal of the solutions, and the use of various types of baths.

The cost of chemical control of sap stain, using some 15 gal. solution/1,000 board ft., is estimated at 2–5*d.*/1,000 board ft.

Currier (R. A.). **Compression of white pocket veneer in hot-pressed Douglas-Fir plywood.**—*For. Prod. J.*, **10**, 8, pp. 409–413, 5 fig., 6 graphs, 1960.

In Ore. large amounts of white pocket (*Fomes pini*) [cf. **34**, 499] may be expected in large young-growth Douglas fir [*Pseudotsuga menziesii*] by harvest time. The compression characteristics of white pocket veneer were studied at Ore. For. Res. Centre, Corvallis, with a view to promoting the utilization of such infected wood. Veneer sheets, $\frac{1}{8}$ in. thick, were allotted to 4 grades: A and Nos. 1, 2, and 3 WP (white pocket). With standard hot-pressing schedules the degree of compression in white pocket veneers increased with the amount of white pocket. Compared with A grade the compression of No. 1 WP increased only slightly, while that of No. 3 WP was more than doubled. It was possible, however, to obtain acceptable plywood bonds with reduced pressure. Standard glue-line shear tests indicated that the breaking strength of white pocket veneer plywood decreased as white pocket increased. Percentage of wood failure is probably not a reliable indicator of glue-bond quality when plywood contains white pocket. All white pocket grades resisted delamination excellently.

Cowling (E. B.) & Sachs (I. B.). **Detection of brown rot with osmium tetroxide stain.**—*For. Prod. J.*, **10**, 11, pp. 594–596, 1 fig., 1960.

At the Forest Products Lab., Madison, Wis., the application of aqueous 1% (w/v) osmium tetroxide sol. to a freshly-cut surface of wood decayed by various known

fungi caused the reduction to metallic osmium and the production of a black stain in less than 5 min. if the fungus was a brown rot organism, or more than 20 min. if a white rot fungus was involved or the wood was undecayed. Samples decayed by *Poria monticola* darkened equally quickly whether decay was incipient (2% wt. loss) or advanced (70%). It is suggested that this test may be applied for the detection of brown rot in timber structures and various forms of stored timber, particularly pulpwood.

Duncan (Catherine G.). **Soft-rot in wood, and toxicity studies on causal fungi.**—*Proc. Amer. Wood-Pres. Ass., 1960*, pp. 27–35, 2 fig., 1960. [21 ref.]

In this informative paper the occurrence, macroscopic and microscopic appearance, chemical composition, and strength properties of soft rotted wood [cf. **39**, 750 *et passim*] are reviewed; studies to determine the causes of soft rot and the physiological characteristics of soft rot fungi are described. The concs. of chemical compounds in malt agar that inhibited growth of 32 soft rot fungi and 9 basidiomycetes are tabulated.

Gadd (G. O.). **Concerning pulp-damaging fungi and the terminology used in their description.**—*Norsk. Skogindustri, 1960*, 7, pp. 3–7, 1960. [Finn. summ.]

In an attempt to find a standard terminology in simple terms for application by the trade to various recognized forms of injury to wood pulp by fungi the author describes the types of damage and suggests that rots caused by basidiomycetes should be classed as 'corrosion rots', when both lignin and cellulose are attacked, or 'destruction rots', when carbohydrates are utilized; other fungi attacking pulp, which mostly cause only discoloration, should be termed 'moulds'. Comments by P. Russell are appended.

Gadd (G. O.) & Williamson (H.). **On the impregnation of pulp with mercurial compounds.**—*Paperi ja Puu*, **42**, pp. 459–460, 462–463, 465–466, 1 fig., 1960. [Finn. summ.]

At the Pulp and Paper Res. Inst., Helsinki, the capacity of fibres in wet pulp to inactivate organo-mercurial fungicides [**38**, 635] was determined. The extent of inactivation was very varied, part of it occurring immediately and the rest over a long period, depending on temp. and pH. Alum at 4 kg. dry ton prevented inactivation and thus prevented mould damage for at least 30 days.

Huber (H. A.), Olson (G. E.), & Gooch (R. M.). **Test data as a guide for preservative specifications.**—*For. Prod. J.*, **10**, 10, pp. 491–493, 3 fig., 1 graph, 1960.

The authors (Dow Chemical Co., Midland, Mich.) state that a new specification, the 'results specification', is now being employed by users of treated wood; the exact amount of preservative required and the depth of penetration are 'spelled out', inspection and analyses being made immediately after treatment on a statistical basis. Chemical analyses are used by producers of western red cedar [*Thuja plicata*] poles as a quality control device with respect to thermal treatment, and this approach is now written into the specification for all western spp. of wood by the Edison Electric Inst.; definite retentions of pentachlorophenol, as determined by chemical analyses, are required. It is largely as a result of the experiments of Meyer and Gooch with treated wood stakes [**36**, 365] that the American Wood Preservers' Ass. Specification C1-58 requires that 'the conc. of pentachlorophenol in the treating solution shall be 4·5–5·5% by wt. and the petroleum used shall meet the requirements of Standard P-9 for heavy solvent'. Later work [**37**, 607] indicated that the conc. might be reduced to 3% for sleepers without loss of effectiveness. A group of 202 pentachlorophenol-treated southern yellow pine [*Pinus*

spp.] poles after 17 yrs.' service were all sound, and the pentachlorophenol concs. 7, 10, and 15 yr. after treatment still promised further long life.

Soil-block tests, carried out in accordance with ASTM Standard D 1413–56 T, showed that the threshold values of 2% pentachlorophenol in creosote and 7% pentachlorophenol solutions were approx. the same on both weathered and unweathered blocks. A parallel test with $\frac{3}{4} \times \frac{3}{4} \times 18$ in. stakes shows so far that the serviceability of 7% pentachlorophenol is similar to that of 98% creosote with 2% pentachlorophenol at the 3 lb. cu. ft. level; this seems to confirm the evidence obtained in the soil-block tests.

NARAYANAMURTI (C.) & PURUSHOTHAM (A.). **Ascu-wood preservative.**—*Indian For. Records*, N.S., Wood Pres., **1** (*1956*), 1, 92 pp., 14 pl., 1 fig., 2 graphs, 1958. [Received Jan. 1961. 20 ref.]

An account of the properties and behaviour of the timber preservative ascu [**33**, 458 *et passim*] (As_2O_5, $CuSO_4$, and soluble dichromate, 1:3:4), used against fungi and other organisms, with tables giving the results of 20 yr. service tests, together with photographic records.

SMITH (D. N. R.) & COCKCROFT (R.). **A method of obtaining uniform distribution of wood preservative in toxicity test blocks.**—*Nature, Lond.*, **189**, 4759, pp. 163–164, 2 graphs, 1961.

At the Forest Products Res. Lab., Princes Risborough, Bucks., a more uniform distribution of timber preservative was obtained by cooling the test blocks below the freezing-point of the solutions immediately after impregnation, then subliming off the solvent *in vacuo*.

OLIVER (A. C.). **Timber durability and the Mushroom grower.**—*M.G.A. Bull.* 133, pp. 9–18, 1961.

The necessity to use either naturally durable or treated timber in mushroom houses is emphasized and it is noted that while many preservatives are unsuitable for horticultural use, those based on Cu naphthenate or highly fixed waterborne preservatives are quite safe, as are pentachlorophenol compounds if precautions are taken to prevent contaminated water from dripping on to the crop. A classified list of preservatives, pretreated plywoods, and durable timber suitable for use by the mushroom grower is appended.

WINSTEAD (N. N.) & GARRISS (H. R.). **Control of Cabbage clubroot in North Carolina.**—*Plant Dis. Reptr*, **44**, 1, pp. 14–18, 2 fig., 1960.

In tests by N. Carol. State Coll., Raleigh, at 2 locations where clubroot (*Plasmodiophora brassicae*) [**37**, 565] is a serious problem the resistant Wisconsin line 192255 gave 113 marketable heads from 150 transplants in heavily infested fields, the very susceptible Oakview 0 untreated and 39 treated with 2 lb. quintozene/100 gal. transplant water. On land not planted with cabbage for several years the corresponding figures were 100, 50, and 75%. Most Badger Market treated plants produced marketable heads, whereas 10–100% failed when untreated.

In seed beds treatment with 1–3 lb. methyl bromide/100 sq. ft. under plastic eliminated or almost eliminated club root in Oakview when 85–100% untreated had clubs. All the resistant plants were healthy in the untreated beds. *Rhizoctonia* [*Corticium*] *solani* attacked 40–50% of the seedlings in untreated but none in treated beds. The 1 lb. rate was as effective as the 3 lb.

HACKEL (E.). **Zur Ätiologie einer Weichfäule des Chinakohls.** [On the etiology of a soft rot of Chinese Cabbage.]—*Phytopath. Z.*, **39**, 4, pp. 361–388, 9 fig., 1960. [Engl. summ.]

A bacterial rot of *Brassica chinensis* caused by *Erwinia aroideae* [**38**, 44] and *E.*

carotovora [**37**, 746] is reported for the 1st time in Germany from the Phytopath. Inst., Martin Luther Univ., Halle-Wittenberg. The bacteria are present in most cultivated soils and remain viable for long periods in sterile soil, sterile water, and plant remains, but are sensitive to drying. They gain entry through wounds, particularly those caused by parasitic animals and micro-organisms. Transmission is apparently effected mainly by insects, not all of which harm the plant. The most serious damage occurs when heavy insect attack coincides with high humidity during the developmental stage of the plant. Remedial measures consist principally in control of insects, and in some cases soil disinfection. Low humidity and low temp. in clamps and storage places will help to prevent the development of the bacteria.

Smith (H. C.). **Control of Swede dry-rot (Leptosphaeria maculans (Desm.) Ces. & de Not.).**—*Proc. Conf. N.Z. Inst. agric. Sci. 1960*, pp. 90–103, 3 fig., 4 graphs, 1960.

During the past 55 yr. *L. maculans* (syn. *Phoma lingam* &c.) has been an important field disease of swede in New Zealand. Seed disinfection is of little value [**39**, 200] and spraying is costly and largely ineffective against losses that may be severe in 2nd crops. Breeding for resistance offers the best hope of control and the results of inoculations to determine the reactions of swede and turnip vars. to dry rot [**34**, 502], club root [*Plasmodiophora brassicae*], cauliflower mosaic, and turnip mosaic viruses are presented. Combined resistance to dry rot, club root, and cauliflower mosaic [virus] may be obtainable from crosses of Gartons Parkside × Wye × Sensation and moderate resistance to dry rot by Doon Spartan × Wye.

Свекловодство. Том III. [Beet Growing. Vol. III.]—642 pp., illus., Kiev, State Publishers agric. Lit. Ukr. S.S.R., 1959. Roubles 19.45. (2nd, revised, ed.)

Part 2 [with 11 pp. ref.] of this composite work, 'Diseases of Sugar Beet and Control Measures' (pp. 339–591), includes chapts. on causes of diseases (pp. 343–357), effect of environment (358–366), chemicals for control (367–376), diseases of glomerules (377–384), of seedlings (385–412), of aerial organs (413–480), of the whole plant due to unfavourable nutrient conditions (481–487), of the roots during the growing period (488–516), of stecklings (517–522), clamp rots (523–538), measures for control (538–566), a table for determining diseases (567–575), sugar beet mycoflora (576–582), and an historical account of phytopathological organizations and the study of diseases of sugar beet and beet roughage in the U.S.S.R. (583–591). There are Russian and Latin indexes to pathogens and terminology (pp. 629–636).

Agarkov (V. A.). Ржавчина Сахарной Свеклы. [Sugar Beet rust.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 11, pp. 36–38, 2 fig., 1960.

An account by the Kamenets-Podol'sk agric. Inst., U.S.S.R., of the development and control of *Uromyces betae* [cf. **38**, 287] under local conditions. In addition to various agrotechnical operations 5–10 min. dips of roots in 0·25–0·5% granosan or mercuran+slaked lime mixture (1:5–1:10) and seed treatment with granosan (4 kg./ton) or 40% formalin (1:300) are recommended. The summer (uredial) state was controlled effectively by spraying with 1% Bordeaux mixture (4–6% from aircraft) or 0·4% Cu oxychloride (600–800 l./ha.).

Ebner (L.). **Einfluß der Quecksilberbeizung auf Keimung und Jugendwachstum der Zuckerrübe unter besonderer Berücksichtigung ihrer selektiven Wirkung auf die samenbegleitende Mikroflora.** [Influence of mercurial dressing on germination and early development of Sugar Beet, with particular reference to its selective action on the seed-borne microflora.]—*Phytopath. Z.*, **39**, 4, pp. 297–320, 3 fig., 1960. [Engl. summ.]

In 1955 and 1956 at the Inst. für Pflanzenschutz, Hohenheim, Germany, increased

microflora on seed of 6 different origins and reduced germination ran parallel to higher rainfall. Germination of undressed seed under unfavourable conditions fell more rapidly in sterile soil than in unsterilized germination substrates; the percentage reduction was twice as great for poor 1956 seed as for good 1955 seed. The soil microflora clearly inhibited the unfavourable influence of the seed microflora.

In addition to its effect on the seed microflora ceresan [cf. **38**, 363] increases the diam. of the hypocotyl, a result not caused by the exclusion of the seed microflora. Unfavourable effects of seed storage at high humidity are clearly detectable only after some 4 months. Under unfavourable storage conditions Hg dressings cannot provide any permanent protection of germinative ability if *Aspergillus* spp. are present on seed material, as these are not killed by the Hg dressing and can destroy the seed. In infection experiments with organisms isolated from seed material germination was adversely affected only by a few strs. of bacteria. Germination capacity could not be destroyed by the various fungi, with the exception of *Phoma* [*Pleospora*] *betae*, which was found in all samples. *Mucor* was found in 7, *Aspergillus repens* and *A. amstelodami* each in 5, *Verticillium*, *Alternaria*, and *Fusarium* each in 4, and *Botrytis* and *Cercospora beticola* each in 3.

Mischke (W.). **Untersuchungen über den Einfluß des Bestandsklimas auf die Entwicklung der Rüben-Blattfleckenkrankheit (Cercospora beticola Sacc.) im Hinblick auf die Einrichtung eines Warndienstes.** [Studies on the effect of crop climate on the development of Sugar Beet leaf spot (*C. beticola*) in connexion with the establishment of a forecasting service.]—*Bayer. landw. Jb.*, **37**, 2, pp. 197–227, 5 fig., 18 graphs, 1960.

Some results of these studies during 1956–58 in the Danube-Isar area have been noticed [**38**, 286]. There was a clear connexion between dew + rain and increased infection and a hyperbolic connexion between mean temp. during incubation and length of incubation. The sum of the daily temp. means was constant within each incubation period and for the local isolates on Polybeta (337 ± 9·8° C. days). The zero point for fungus development was 0·5°. From experimental results a rule for forecasting is proposed with the following conditions for a critical period: at least 10 lesions on ca. 5% of the plants; 3 days or more with R.H. > 95% for at least 10 hr. within the crop; and a min. temp. in the crop of 10°, even at night.

Wenzl (H.). **Zur Methode der Untersuchung von Rübensaatgut auf Cercospora beticola Sacc.** [On the method for examining Beet seed for *C. beticola*.]—*PflSchBer.*, **25**, 9–12, pp. 129–178, 1 fig., 1960. [Engl. summ.]

Further studies [**39**, 645] at the Bundesanstalt für Pflanzenschutz, Vienna, showed that for accurate determination of conidia adhering to the glomerules it is important to have a sufficient quantity of seed, a suitable ratio of glomerules: water (10 g.: 30–60 ml.), sufficient time for soaking (1–2 hr.), and an appropriate manner and duration of shaking to detach as many conidia as possible. Glomerules must be cleaned of the primary conidia to facilitate a proper determination of conidial production. The washing can be done efficiently with a shaking sieve in running tap water. In routine tests there is not enough time to eliminate all conidia from severely infested samples.

In testing the production of conidia temp. and moisture content of the glomerules must be kept at the right level, colour being an indication of the desired humidity. Before incubating in closed dishes the water content is reduced to 70–75% of that taken up by the material while shaking and washing. Moist filter paper is used as a substratum.

In suspensions prepared from moist glomerules kept for some days at 25–30° C. old and recently produced conidia can be distinguished under the microscope; the

dead ones appear quite empty while the living have cell contents of high light refraction. Germinability can be checked quickly in hanging drops. The formation of conidia can be determined in suspensions from glomerules by counting either the total number of conidia before and after incubation or the recently produced (living) conidia after incubation.

Lockwood (J. L.). **Progress and problems in breeding Peas resistant to root rots.** —*Quart. Bull. Mich. agric. Exp. Sta.*, **43**, 2, pp. 358–366, 1 fig., 1960.

A discussion of work on breeding for resistance to *Fusarium solani* f. *pisi* and *Aphanomyces euteiches* during 1956–59 and the methods used [**40**, 69].

Mikheeva (Mme R. I.). Меры борьбы с аскохитозом Гороха. [Control of ascochytosis in Pea.]—Труд. всес. Инст. Защ. Раст. [*Trud. vses. Inst. Zashch. Rast.*], *1960*, 14, pp. 129–134, 1960.

On the basis of further tests the following schedule for control of *Ascochyta* spp. is suggested for Latvia: (1) early sowing after seed treatment as before [**36**, 682]; (2) application of NH_4NO_3 (150 kg./ha.), superphosphate (200), and potash (250) before and during cropping; (3) 2 applications to the roots of 3% potash sol. (400 l./ha.); and (4) 2 sprays with Cu oxychloride suspension (500 l. ha.). These combined treatments gave an increase of 138·8% green matter and 48·6% yield, and decreased incidence of *A. pisi* by more than $\frac{1}{2}$ and of *A. pinodella* [*Mycosphaerella pinodes*] by more than $\frac{2}{3}$, as compared with the control subject given only NPK. Experiments on spore germination showed 70–85% viability in the overwintered pycnospores; ascospores from the overwintered perithecia of *M. pinodes* were also able to infect pea plants. Accordingly, destruction of plant debris, deep tilling, and a 4–5-yr. crop rotation are recommended.

Yen (D. E.) & Casey (R. J.). **Wilt-resistant Onward Peas.**—*N.Z.J. Agric.*, **101**, 6, pp. 565–566, 1 fig., 1960.

Lines of Onward have been developed at the Crop Res. Div., Otahuhu, which are resistant to the strs. of wilt (*Fusarium orthoceras* var. *pisi*) occurring both in England and New Zealand [**37**, 127]. Selected stocks have been made available for multiplication during 1960–61.

Walker (J.). **Variation in disease reaction within Bean (Phaseolus vulgaris L.) varieties.**—*J. Aust. Inst. agric. Sci.*, **26**, 4, pp. 363–366, 1960.

In a glasshouse experiment at N.S.W. Dept Agric., Sydney, in which lines of different bean vars., grown in pots, were sprayed with an aqueous suspension of *Colletotrichum lindemuthianum* spores [cf. **38**, 120] 2 main types of variation in anthracnose reaction occurred: one between 2 lots of seed of the same name from different sources, the other between individuals from the same seed sample. Therefore all tests for the determination of physiologic races of the fungus should be made with identical pure line seed of differential vars. The origin of this variation in disease reaction within bean vars. is not known, but it may be due to the mixing of breeding lines and the release of the bulk lines as a new var. or to natural crossing and mutation.

Chambers (S. C.) & Hardie (M.). **Sclerotinia rot of Beans.**—*J. Agric. W. Aust.*, 4th ser., **1**, 11, pp. 977–983, 3 fig., 1960.

The recent increase in *S. sclerotiorum* on [runner] beans [*Phaseolus* sp.: cf. **33**, 209] is attributed to changes in cultural practices which leave diseased plant residues in the surface soil. Recent studies have demonstrated the value of trenching to a depth of 18 in. in controlling the germination of sclerotia. Spraying and dusting experiments are described but did not prove satisfactory.

SMARTT (J.). **A guide to Soya bean cultivation in Northern Rhodesia.**—*Rhod. agric. J.*, **57**, 6, pp. 459–463, 1960.

This paper includes notes on pests and diseases. Among the diseases attacking soybean in the area are *Sclerotium rolfsii*, of minor importance, and, the most apparent disease, bacterial pustular leaf blight of undetermined etiology; it does not appear to cause much damage but is probably seed-borne. On leaves *Phyllosticta*, *Pyrenochaeta*, *Ascochyta*, and *Mycosphaerella* spp. have been recorded. The seeds may be discoloured by a fungus which is tentatively regarded as *Cercospora kikuchii*. As soybean mosaic virus also occurs it is recommended that crops to be used for subsequent plantings should be rogued.

JOHNSON (H. W.) & MEANS (URA M.). **Interactions between genotypes of Soybeans and genotypes of nodulating bacteria.**—*Agron. J.*, **52**, 11, pp. 651–654, 1960.

At the Crops and Soil and Water Conservation Res. Div., Beltsville, Md, 94 of 116 soybean vars. developed chlorosis when inoculated with str. 76 of *Rhizobium japonicum* [cf. **38**, 113]. When 24 (or 34%) of a random sample of 70 strs. of the bacterium were used to inoculate 4 vars., 5 caused chlorosis on all 4, 7 on 3, 4 on 2, and 8 on 1. Only 7 of 22 vars. resistant to str. 76 in preliminary work failed to develop chlorosis when inoculated with str. 76 and 3 other strs. in subsequent tests.

MEDERSKI (H. J.), HOFF (D. J.), & WILSON (J. H.). **Manganese oxide and manganese sulphate as fertilizer sources for correcting manganese deficiency in Soybeans.**—*Agron. J.*, **52**, 11, p. 667, 1960.

In tests in 1958 and 1959 at Ohio agric. Exp. Sta. with Blackhawk soybeans in Mn-deficient soil [cf. **34**, 568] $MnSO_4$ (67%), in combination with P_2O_5 at 40 lb./acre, low N, and no K, gave the highest yields, corrected the deficiency, and raised the Mn level in the leaves. Though MnO is less available than $MnSO_4$ results were fairly good and either, when mixed with appropriate fertilizer, should control Mn deficiency of soils in N.W. Ohio.

PURSS (G. S.). **Further studies on the control of pre-emergence rot and crown rot of Peanuts.**—*Qd J. agric. Sci.*, **17**, 1, pp. 1–14, 3 fig., 1960.

Experiments by the Div. Plant Ind., Dept Agric. & Stock, Brisbane, during 1955–59, which are described, showed that organo-Hg fungicides were effective against *Rhizopus* spp. on groundnuts [**34**, 125] but less so against *Aspergillus niger* and *Penicillium* spp., which were controlled to some extent by captan, thiram, and chloranil, though these were less effective than organo-mercurials against *Rhizopus* spp. In field trials the best control of both pre-emergence rot and crown rot was given by a combination of an organo-mercurial such as ceresan (2 parts) with captan (1 part), though a 5:1 combination proved satisfactory under experimental conditions. Control of crown rot enables reduction of seed rates.

ALVAREZ G. (L. A.). **Phoma canker of Pigeonpeas in Puerto Rico.**—*J. Agric. Univ. Puerto Rico*, **44**, 1, pp. 28–30, 1 fig., 1960. [Span. summ.]

In Feb. 1954 a serious canker of pigeon pea damaged crops near Penuelas. A *Phoma* sp. [cf. **9**, 622] isolated from the cankers was characterized by papillate pycnidia of variable size. The pycnospores averaged $4 \times 1{\cdot}5\,\mu$. The disease was reproduced by inoculation.

RANGASWAMI (G.) & PRASAD (N. N.). **A bacterial disease of Cicer arietinum L.**—*Indian Phytopath.*, **12** (*1959*), 2, pp. 172–175, 3 fig., [1960].

At the Dept Agric., Annamalai Univ., Madras State, the causal agent of a post-emergence rot of *C. arietinum* seedlings was determined as *Xanthomonas cassiae* [cf. **31**, 86]. The radicle developed water-soaked lesions which turned dark brown,

a soft-rot attacked the tissues, and the seedling wilted within 3–4 days. *X. cassiae* from *C. arietinum* was also pathogenic to *Cassia occidentalis* but not to a number of other hosts.

Mathur (R. S.), Jain (J. S.), & Atheya (S. C.). **Resistance of Gram varieties to Fusarium wilt in Uttar Pradesh, 1949–1958.**—*Curr. Sci.*, **29**, 10, p. 403, 1960.

In varietal trials at Kanpur, U.P., 6 of 94 lines of *Cicer arietinum* were classified resistant to *F. orthoceras* var. *ciceri* [**37**, 627] with less than 10% wilted plants in heavily infested soil.

Rangaswami (G.) & Prasad (N. N.). **A new seedling blight of Phaseolus mungo L. and P. aureus Roxb.**—*Indian Phytopath.*, **12** (*1959*), 2, pp. 184–185, 2 fig., [1960].

A severe seedling blight on black (*P. mungo*) and green gram (*P. aureus*) during Feb.–Mar. 1958 and again in 1959 near Annamalainagar, Madras, was investigated at Dept Agric., Annamalai Univ. A *Phomopsis* sp. distinct from *P. vexans* on eggplant [**37**, 569] was cultured and it reproduced the disease on inoculation. It was also pathogenic to *Dolichos lablab* and radish, but not to 9 other hosts tested.

Vovk (A. M.). О фильтруемости вируса мозаики Лука. [On the filterability of Onion mosaic virus.]—Труд. Инст. Генет. [*Trud. Inst. Genet.*], *1960*, 27, pp. 372–375, 1960.

Onion mosaic virus [**39**, 140] particles in undiluted sap sometimes passed through filter paper and sometimes did not, indicating aggregation. Disaggregation took place on the addition of water or a buffer to the sap before filtering, the particles then passing easily. Under the electron microscope (×7,000) the elementary particles were spherical, approx. 200 mμ diam. None were found in sap from healthy leaves. Undiluted sap was non-infective after passage through a Seitz filter, and infection was low also when the sap was first diluted with water or a buffer.

Chumaevskaya (Mme M. A.) & Gorlenko (M. V.). Новый для СССР бактериоз Моркови. [A bacteriosis of Carrot new for the U.S.S.R.]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vÿssh. Shkol.*], biol. Sci., *1960*, 4, pp. 114–116, 1960.

In 1959 a report was received at the Dept for Lower Plants, Moscow Univ., of the widespread occurrence in the fields of the W. Siberian Veg. Sta. of a carrot disease previously unknown in the U.S.S.R. Symptoms were leaf lesions and drying of umbels and stems. A bacterium isolated from infected seed and leaves produced similar symptoms on inoculation, and was identified as *Xanthomonas carotae* [cf. **22**, 88]. There are samples in the Dept of similarly infected carrot from the Voronezh region and Kazakhstan, so that the disease may be more widespread in the Soviet Union.

Bobeș (I.). **O boală nouă a Pătrinjelului, provocată de ciuperca Alternaria tenuis Nees.** [A new disease on Parsley leaves caused by *A. tenuis*.]—*Lucr. Ştiinț. Inst. Agron. Cluj*, *1958*, 14, pp. 241–248, 1958. [Russ., Hung., Engl. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 18, pp. 177–178, 1960.]

The disease was 1st noted in Romania in 1956 and *A. tenuis* cultured.

Baker (R.), Phillips (D. J.), & Martinson (C.). **Control of Fusarium yellows of Celery by means of soil fumigation.**—*Plant Dis. Reptr*, **45**, 1, pp. 76–77, 1961.

At Colo. State Univ. *F. oxysporum* f. *apii* [cf. **35**, 512] was reduced and yields increased on sandy loam soils where losses were moderate by both chloropicrin and nemex (50% chloropicrin+50% chlorinated C_3 hydrocarbons) at 470 or 790 lb./acre; the higher rate should be used where the disease was severe in previous years, though even the lower rate may not be economically feasible.

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AUTHORS' NAMES

Aas, 405
Ablakatova, 418
Acha, 407
Adsuar, 427
Agarkov, 444
Aichele, 418
Akai, 440
Allen, 399
Alvarez, G., 447
Ando, 407
Antoine, 428
Armstrong, G. M., 416
Armstrong, J. K., 416
Arnoux, 393
Askarova, 417
Asmaev, 431
Atheya, 448
Aubert, 430
Avetisyan, 417
Avtonomov, 417
Aycock, 392
Bagchee, 437
Bagnall, 425
Baker, 448
Banerjee, 440
Bärner, 401
Basham, 386
Baudin, 405, 428
Baxter, 419
Bazzigher, 438
Belokhonov, 418
Bérces, 425
Bergold, 412
Bhapkar, 415
Bhargava, 407
Bigot, 392
Blake, 433
Blodgett, 418
Bobeș, 448
Boocock, 441
Boosalis, 405
Borovkov, 386
Bos, 420
Bowling, 385
Boyce, 437
Brady, 403
Braithwaite, 433
Bratus', 388
Brejcha, 422
Buchanan, 386
Buchinskiĭ, 431
Calabretta, 433
Campana, 386
Caroselli, 436
Casey, 446
Castellani, 421
Chambers, 412, 446
Chavan, 415
Chen, C.-P., 393
Chen, Y.-S., 402
Cherepanova, N. P., 426
Cherepanova, R., 424
Chiaverina, 400
Chitzanidis, 398
Chod, 390
Christiansen, 406
Chrometzka, 421
Chumaevskaya, 448
Cockcroft, 443
Coley-Smith, 392
Conover, 385
Conroy, 389, 425
Corradini, 399
Cowling, 441
Craighead, 387
Cruikshank, 431
Curl, 400
Currier, 441
Dadant, 405
Dale, 396
Darby, 433
Degtyareva, 429
Delcambe, 426
D'Emmerez de Charmoy, 429
Derbyshire, 386
De Robertis, 407
Deshpande, 403
De Waart, 403
Di Menna, 403
Dozono, 407
Drechsler, 406
Duddington, 396
Duncan, 442
Ebben, 434
Ebner, 444
Eliade, 404
Fergus, 388
Findlater, 390
Firman, 416
Foucart, 426
Frazier, 420
Fulton, J. P., 396
Fulton, N. D., 396
Gadd, 442
Gams, 404
Ganguly, 414
Garretsen, 389
Garriss, 443
Gäumann, 403
Geard, 399
Gelcerová, 402
George, 416
Georgoussis, 398
Gibbs, 389
Gibson, 436
Gocho, 411
Golovin, 426
Golubintseva, 420
Gooch, 442
Goode, 396
Gorlenko, 448
Gray, 390
Guillemat, 392
Gyorffy, 397
Hackel, 443
Haga, 414
Hardie, 446
Hardisty, 419
Harrison, 392
Harvey, 393
Hastie, 421
Henry, 405
Herold, 412
Heyns, 420
Hickman, 392
Hirth, 431
Hitier, 385
Ho, 393
Hoff, 447
Hoffmann, 398
Holmes, E., 425
Holmes, F. W., 436
Holton, 410
Hooker, 426
Horówna, 424
Horváth, 424
Huang, C. S., 430
Huang, T. L., 430
Huber, 442
Hudson, 429
Hull, 390
Inoue, 411, 412, 414
Itô, 437
Ivashenko, 412
Jacquiot, 438
Jain, 448
Jenkins, 392
John, 427
Johnson, D., 405
Johnson, H. W., 447
Johnson, R. M., 410
Johnston, 395
Jørgensen, 408
Joshi, 407
Kambayashi, 402
Kapoor, 413
Karling, 406
Keil, 419
Keller, 423, 425
Kendrick, 410
Kern, 403
Khalacheb, 432
Khan, 438
Khovanskaya, 409
Kljajić, 422
Klomparens, 438
Klyushkin, 435
Knorr, 415
Kobayashi, 437
Kochev, 405
Kondrat'ev, 388
Korenyako, 434
Koveshnikov, 434
Kozhevnikova, 425
Kozłowska, 423
Kulkarni, 415
Kurata, 411
Kýrýlenko, 388
Lambe, 400
Lambers, 412
Lapetite, 438
Lauffenburger, 428
Lemin, 438
Lentz, 406, 435
Levin, 401
Linden, 429
Lipton, 393
Lockwood, 446
Logan, 396
Loïdina, 430
Luijten, 399
Maas Geesteranus, 423
Machacek, 409
MacKinnon, 424, 425
Magarvey, 398
Mahadevan, 385
Major, 400
Malaguti, 415
Mandryk, 431
Marchini, 400
Martinson, 448
Maruyama, A., 414
Maruyama, S., 414
Mathur, 448
Matta, 421
Matýshev'ska, 435
McKay, 435
McKeen, 432
McKinley, 398
Means, 447
Mederski, 447
Melville, 419
Merrett, 432
Messiaen, 391, 393
Mikheeva, 446
Miličić, 408
Miller, 387
Mironenko, 414
Mischke, 445
Mitov, 410
Mkhitaryan, 409
Montuelle, 427
Moreau C., 400, 409
Moreau, M., 409
Moriondo, 435, 439
Moss, 438
Mounat, 385
Mulder, 429
Munjal, 413
Mushnikova, 400
Nadakavukaren, 404
Naef-Roth, 403
Nagae, 411
Nag Raj, 416
Naha, 440
Nakagawa, 411
Nakatai, 402
Narayanamurti, 443
Negrutskiĭ, 387
Nelson, 387
Nestorescu, 404
Neubauer, 422
Nieuwhof, 389
Nishio, 411
Nitzany, 432
Noltes, 399
Nüesch, 387
Nukumizu, 407
Nyuksha, 401
O'Brien, 393
Oliver, 443
Olson, 442
Onýshchenko, 419
Orloś, 436
Ota, 439
Padmanaghan, 414
Page, 426
Palti, 402
Parfilova, 410
Pavgi, 413
Pavlinova, 401
Pawsey, 440
Pedersen, 408
Peive, 396
Peterburgskiĭ, 396
Peterson, 403
Petrasovits, 413
Petričić, 422
Petrlík, 422
Phillips, 448
Pietkiewicz, 391
Podhradszky, 413
Ponomarenko, 386
Prasad, 447, 448
Přeslička, 394
Prisyazhnyuk, 440
Pshedetskaya, 426
Puroshotham, 443
Purss, 447
Quispel, 436
Rangaswami, 447, 448
Rankin, 424
Rasolofo, 405
Rataj, 417, 418
Rautenshteĭn, 407
Reichmann, 425
Rochow, 411
Rosinski, 386
Rossi, 399
Russell, G. E., 389
Russell, P., 389
Ryan, 415
Rýzhkov, 430
Sachs, 441
Sadovnikova, 388
Said, 415
Salerno, 421, 433, 436
Sarkar, 421
Sarmah, 429
Sato, K., 439
Sato, T., 398
Satokawa, 414
Scharen, 405
Schicke, 433
Schmidt, 390
Shevchenko, 439
Shoji, 439
Shopina, 409
Shul'ga, 412
Simmonds, 394
Slack, 396
Slepneva, 434
Sludskaya, 415
Smartt, 447
Smith, D. N. R., 443
Smith, H. C., 444
Snegirev, 429
Soga, 411
Spalding, 411
Sproston, 400
Stall, 385, 433
Staněk, 394, 422
Stapp, 418
Starý, 422
Steinberg, 385
Strider, 391
Štys, 422
Sun, 391
Sundström, 406
Sung, 393
Sylvester, 420
Taber, 403
Templeton, 396
Terekhova, 430
Thayer, 392
Thornton, 404
Tollenaar, 420
Tomizawa, 398
Tröger, 397
Tsuda, 412, 414
Tulloch, 419
Tyler, 403
Udjbinac, 408
Ueyama, 440
Ujević, 422
Valenta, 407
Vámos, 413
Van den Ende, 437
Van der Kerk, 399
Van Hoof, 413
Van Regenmortel, 393
Vasil'evskiĭ, 397
Vasudeva, 406
Verhoyen, 391
Villanueva, 407
Vitanov, 438
Volodarskiĭ, 431
Vovk, 448
Wada, 414
Walker, 446
Wallace, 409, 412
Wallis, 439
Ward, 405
Wasserbauer, 394
Watanabe, S., 411
Watanabe, Y., 412
Watson, 392
Webb, 393
Webster, 415
Weibel, 412
Wenzl, 445
White, 386
Wienhues-Ohlendorf, 410
Wiering, 389
Wilkinson, 432
Williamson, 442
Wilson, J. H., 447
Wilson, R. A., 419
Winstead, 443
Wormer, 416
Wright, 386
Yen, 446
Yoshii, 398
Young, 424
Zaleski, 424
Zanardi, 432
Zapletalová, 417
Zattler, 421
Zentmyer, 387
Zsoldos, 413

SUBJECT INDEX

GENERAL
- Reports, Conferences, &c., Queensland, Sarawak, Surinam, **394–396**; Forest Res. Inst., N.Z., 388; Sugar Exp. Stas., Queensland, 427–428
- Books, **396**
- Bacteria, **396–397**
- Deficiency Diseases, 405, 447
- Diseases in Madagascar, 405; India, 406
- Fungicides, **397–400**
- Industrial, **400–401**
- Miscellaneous Publications, **401–402**
- Mycorrhiza, **402**
- Physiology, **402–403**
- Root Rots, 403, 406, 434
- Soils & Fertilizers, 399, **403–405**
- Systematic Mycology, **405–407**
- Viruses, **407–408**

DISEASES AND DISORDERS OF
- Cacao, 408
- Cereals, **408–415**
  - Wheat, 409–411
  - Barley, 411–412
  - Oats, 412
  - Rye, 412
  - Maize, 412–413
  - Rice, 413–415
  - Sorghum, 413
- Citrus, **415–416**
- Coffee, **416**
- Cotton, **416–417**
- Fibre Plants, **417–418**
- Fruit, **418–421**
  - Pome fruit, 418–419
  - Stone fruit, 419–420
  - Soft fruit, 420
  - Banana, 420–421
  - Tropical fruits, 421
  - Olive, 421
- Hops, **421–422**
- Officinal Plants, **422–423**
- Potato & Sweet Potato, **423–427**
- Rubber, **427**
- Sugarcane, **427–429**
- Tea, **429**
- Tobacco, **385, 429–432**
- Tomato, **385–386, 432–435**
- Trees, **386–389, 435–443**
  - Broad leaf trees, 386–387, 435–438
  - Conifers, 387–388, 438–440
  - Timber, 388–389, 440–443
- Vegetables, **389–394, 443–448**
  - Brassicas, 389, 443–444
  - Beet & Sugar beet, 389–390, 444–446
  - Legumes, 390–392, 446–448
  - Onions, &c., 392, 448
  - Carrots, 392, 448
  - Celery, 392, 448
  - Cucurbits, 393–394